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CONFIDENTIAL RECOMMENDATIONS AS A BASIS FOR SELECTING TEACHERS

MIRIAM DOZIER
Secretary, Teachers' Appointment Committee
University of Texas

The recommendation of candidates for teaching positions as made by appointment committees of colleges and universities is based largely upon information gathered from confidential letters. Accordingly, such letters serve a vital purpose in our educational system because they are veritably the foundation for the selection and promotion of many teachers. The importance of the letter of recommendation and the fact that, from many standpoints, it is objective in nature make the study of it appear a legitimate endeavor.

The blank inquiry forms sent out by the Appointment Committee of the University of Texas[1] allow almost perfect freedom in the selection of points to be emphasized. Hence the value of the recommendations received by this Committee depends largely upon the number of elements of teaching success submitted, provided such elements are selected with discrimination.

Source of the data.—The recommendations examined in this study include all statements in the files of the Teachers' Appointment Committee of the University of Texas, concerning 179 candidates. The total number of letters is 1,132, of which 482 concern candidates who had not had teaching experience at the time they were written, and 650 concern candidates who had had

[1] The complete data upon which this article is based are to be found in the files of the Appointment Committee of the University of Texas and in a Master's thesis in the library of the same institution. The writer is under obligation to Dr. C. T. Gray for directions in carrying out the work involved in the thesis and for suggestions in the formulation of this article.

teaching experience. The 179 different individuals include 33 inexperienced and 27 experienced Seniors, 13 inexperienced and 20 experienced Juniors, 23 inexperienced and 24 experienced Sophomores, and 15 inexperienced and 24 experienced Freshmen. There are 84 inexperienced and 95 experienced candidates. Among the experienced candidates are those who had had no experience except practice teaching as well as those who had had one or more years of regular teaching experience.

The 1,132 recommendations were written by persons—both in Texas and in other states—who for the purpose of this study were divided into four groups. Group A consisted of 224 faculty members in Colleges of Arts and Sciences, Engineering, and Law. Group E was composed of 33 faculty members in Schools of Education. Group S was made up of 163 school people—superintendents, principals, supervisors, and teachers. Group L included the remaining 177 persons none of whom was in the teaching profession.

Method of procedure in selecting the qualities.—In reading each recommendation the writer selected the statements which mentioned qualities present or absent in the candidate. For instance, if a candidate were considered brilliant, then "brilliance" was listed as a desirable characteristic; if the candidate were conceived as not brilliant, then "brilliance" was again counted as being a desirable quality. As each quality appeared in a recommendation it was recorded on a large chart at the head of a vertical column, and opposite the name of the candidate concerned. The initial of the writer with a subscript "a," "e," "s," or "l," was used to indicate the group to which he belonged, as previously described. Eight charts were thus constructed, one each to represent Seniors, experienced and inexperienced; Juniors, experienced and inexperienced; Sophomores, experienced and inexperienced; and Freshmen, experienced and inexperienced.

From the 1,132 recommendations examined a total of 805 qualities was listed. It was not thought desirable in this study to condense the number of qualities by combining and constru-

ing many of them as synonymous. The following outline presents a classification of all qualities listed in the recommendations:

I. Personal equipment
  1. Character
  2. Natural endowment or traits
  3. Personality
    a. Appearance
    b. Attitude or spirit
    c. Bearing or address
    d. Disposition
    e. Manner
    f. Manners
  4. Intellectual capacity
II. Social equipment[2]
III. Professional equipment
  1. Scholarship
  2. Details of preparation
  3. General professional qualifications
  4. Type of student
  5. Kind of work done as a student
  6. Teaching success
    a. As a teacher
    b. As a disciplinarian
    c. As an instructor
    d. General qualities or evidences of success

With these data in hand, three problems were given particular attention, and it is with these three problems in mind that the present article is written. First, What type of candidate has his potential success as a teacher most carefully analyzed by those who write recommendations concerning him? Second, What group of writers most carefully analyzes the probable teaching success of candidates? Third, What factors of teaching success are most emphasized?

Consideration Received by Different Types of Candidates

In this section the four classes of candidates will be considered from the point of view of the treatment accorded them by

[2] Social equipment includes all those qualities which seem to contribute to success in dealing with pupils, patrons, official superiors, and co-workers.

the various groups of writers. For the purpose of making this comparison, nine qualities have been considered. These are derived from the outline given above under the main headings of personal equipment, social equipment, and professional equipment. In the latter case, however, the quality, scholastic preparation, has been taken to include the subitems, scholarship, details of preparation, type of student, and kind of work done as a student. The nine qualities with the number of items used by the writers and classified under each of these qualities are:

1. Character, 129 items
2. Conduct, 7 items
3. Natural endowments, 44 items
4. Personality, 187 items
5. Intellectual capacity, 79 items
6. Social qualities, 31 items
7. Scholastic preparation, 141 items
8. General professional qualities, 46 items
9. Professional success, 141 items

In order to derive an adequate basis of comparison, it was necessary to total the number of times the individuals of each group of writers—A, E, S, and L—mentioned each of the nine qualities. No writer, however, was counted more than once for any one quality. The distinction between the four groups of writers was kept for each of the four classes of candidates, inexperienced and experienced. For example, the total number of times the writers of Group A used "character" in recommending inexperienced candidates was: Seniors, 113; Juniors, 41; Sophomores, 31; Freshmen, 30. These totals were obtained by finding the number of times the writers of Group A used all qualities under the general heading of character. It may seem, at first thought, that these totals represent the number of writers rather than the number of times the qualities are mentioned in the recommendations, exclusive of all duplicates. This is not the case, however, for 129 different items of character were listed; and many of the writers mentioned several of these items, though no writer is counted more than once on any one item. The totals

for all nine qualities are taken in the same way as that just described for character.

Since raw frequency does not give a final basis for comparison, one may convert each of these totals into a percent of the number of times each quality might have been mentioned had every individual writer used all the qualities used by everybody. For example, it would have been possible for each of the 224 writers of Group A to mention all of the 129 items included under "character"—a total of 28,896—for each candidate. This group of writers actually did use these items 113 times about the 33 inexperienced Seniors. Expressing the percent that 113 is of 28,896 and dividing by 33 gives .00011. Since there are 4 groups of writers, 9 qualities, and 8 groups of candidates, 288 such computations were made. As already indicated, these percents show the advantage, taken by the several groups of writers, of using the total possible terms of recommendation, for each individual student recommended.

It is easily seen, from the statement previously made as to the number of percents derived, that in each of the four groups of writers 18 percents for each of the four classes of students are computed—nine qualities for both inexperienced and experienced candidates. In some instances, however, the percent is zero. Professional success for inexperienced candidates must of necessity be zero. Conduct for both experienced and inexperienced candidates, in the case of the writers of Group E, is also zero. Therefore, the comparison of the four classes of students at the hands of three groups of writers, namely, A, S, L, is made on the basis of 17 instead of 18 percents; whereas, the comparison of the four classes of students at the hands of the writers of Group E is made on the basis of only 15 percents.

If it is kept in mind that these percents have been construed to show the advantage taken by the several groups of writers of using the total possible terms of recommendation for each student considered, an examination of the percents shows the following facts concerning the recommendations written by the writers of Group A: (1) Seniors have the highest percent in

13 of the 17 calculations, (2) Juniors have the highest percent in 2 of the 17 calculations, (3) Sophomores have the highest percent in 2 of the 17, and (4) Freshmen have the highest in 0 of the 17.

In the same manner the following facts are noted concerning the writers of Group E: (1) Seniors have the highest percent in 9 of the 15 calculations, (2) Juniors have the highest percent in 2 of the 15, (3) Sophomores have the highest percent in 2 of the 15, and (4) Freshmen have the highest in 2 of the 15.

From the statements, it is seen that the Seniors are distinctly favored by these writers in that a greater number of terms of recommendations is used concerning them. Three reasons for this condition are possible: (1) Seniors may be better known to their instructors than are other students; (2) the traits listed from the recommendations, being possibly more highly developed in Seniors, may be more easily detected in them than in other students; (3) instructors may be more careful in their analysis because they feel greater responsibility in writing recommendations for Seniors than for any others.

If either of the first two of these reasons be the correct explanation, it would seem that the Juniors should rank next to the Seniors and the Sophomores next to the Juniors. The figures for both groups of writers, however, show that such a ranking does not take place consistently, and the same is true for the writers of Group E. Evidently the explanation does not lie in the first two reasons suggested.

Only the third reason remains. Apparently faculties in writing recommendations feel more responsibility in respect to Seniors than in respect to the other classes. No doubt, this partiality is to be expected. It is the aim of institutions to graduate their students, and Seniors, on the threshold of this goal, seem especially to merit thought and consideration. Again, faculties naturally desire to keep students until graduation. They doubtless think that students with one, two, or even three years of college training are not fully equipped to teach. Accordingly, facul-

ties may not be especially eager to assist students of limited training in securing positions.

A treatment of the data for writers of groups "S" and "L" similar to that described for groups "A" and "E" shows clearly that the Seniors are not favored as before. From the inconsistency of the figures it is safe to assert that the qualities of the various classes are equally well analyzed by the writers of these groups.

Analysis of Qualities of Candidates by Various Groups of Writers

A part of the purpose of this article is to show which of the four groups of writers makes the most detailed analysis of the prospective teachers when writing recommendations. The basis for judging is the number of descriptive terms used in writing the recommendations. The comparison has been made with reference to the nine qualities already mentioned. It has also been made with reference to the three larger groups of qualities—personal, social, and professional—and with reference to all qualities combined.

The numerical basis of comparison is the percents, computed for the writers, qualities, and candidates involved, according to the method already described. Group E enters into more detail in writing recommendations than any other group of writers, Group A is second in this regard, Group S is third, and Group L, fourth. If it is true that in general the more detailed the recommendation the greater its value, Group E ranks first in writing valuable recommendations, while Group A ranks second.

This same ranking is revealed from a consideration of the average number of terms employed by the writers in each of the four groups. In all, 805 qualities were collected from the recommendations examined. Group A used 605 of these terms; Group E, 197; Group S, 404; and Group L, 367. When these numbers are divided by the number of writers in each group, the average number of terms employed by each person turns out to

be for Group A, 2.7; for Group E, 6.0; for Group S, 2.5; and for Group L, 2.1.

One explanation of why Group E leads the way in writing recommendations is the professional viewpoint. The training of teachers is this group's chief concern. They must, therefore, have their standards of an efficient teacher in mind, and the comparison of an individual with these standards becomes relatively easy. Moreover, the writing of recommendations for the use of the appointment committee is one of their professional duties.

TABLE I. RANK MADE BY WRITERS OF GROUP A OF VARIOUS QUALITIES EXHIBITED IN SENIORS

Qualities	Experienced Candidates		Inexperienced Candidates	
	Percent (Prefix .000)	Rank	Percent (Prefix .000)	Rank
(1)	(2)	(3)	(4)	(5)
Social qualities	18	1	14	1
Scholastic preparation	14	2	9	4.5
Character	13	3	11	2
Natural endowment	11	4	10	3
General professional qualities	10	5	5	7
Personality	9	6	8	6
Intellectual capacity	7	7	9	4.5
Professional success	4	8	0	9
Conduct	0	9	1	8

These facts have their effect in the recommendations they write. One of these effects is a more careful and detailed analysis of the candidates' qualities.

Order of Emphasis Given the Various Traits by the Various Groups of Writers

We shall now consider the relative emphasis placed on the various qualities by the different groups of writers. The bases of determination are the percents already referred to in a previous section of this article; they show the advantage taken by the various writers of their opportunities to use the certain terms of recommendation.

It was possible to interpret the orders of emphasis thus given the nine qualities from two standpoints, the correlations and the changes in rank of the various qualities. After many phases of the problem had been considered, it was thought best to deal with the data from the second standpoint. The qualities were therefore ranked according to the percents derived in the first section of this study. But the ranks were not the same for different groups of persons, for experienced and inexperienced candidates. Under these circumstances the number of changes was noted in rank of each quality. As a basis for understanding the method of procedure, reference may be had to Table I.

TABLE II. CHANGES IN RANK OF QUALITIES FOR THE VARIOUS GROUPS OF CANDIDATES BY THE VARIOUS GROUPS OF WRITERS

Writers	Seniors	Juniors	Soph-omores	Freshmen	All Candidates
(1)	(2)	(3)	(4)	(5)	(6)
Group A	10	12	16	16	8
Group E	16	24	6	14	9
Group S	24	24	21	12	18
Group L	20	20	16	16	14
All groups	14	15	20	16	.....

From this arrangement, it is seen that social qualities rank first for both the experienced and inexperienced candidates. Thus there is no change in rank. Scholastic preparation ranks second for experienced and fourth for inexperienced candidates, making two changes in rank. In the same manner, changes for each of the other seven qualities are counted. According to Table I, the total of these changes in rank for the nine qualities is ten. Likewise, the changes made in the ranking by writers of Group A for Juniors, Sophomores, and Freshmen and by the writers of the other groups for each class of students are counted. Then the changes made by each group of writers for all candidates are considered together; and finally, the changes made by

all groups of writers are taken together about each of the four classes of candidates. These results are shown in Table II.

In the interpretation of these data it may be assumed that the various qualities should rank the same for both experienced and inexperienced groups of candidates, with the exception of the one quality professional success. In other words, for the group of candidates considered, none of the qualities is a function of successful experience. If this assumption is true, the different qualities should, under ideal conditions, appear with about the same frequency in the two groups. The fact that they do not is due either to the fact that the recommendations were written in a careless, indifferent manner or to the fact that it was impossible for the writers to detect the presence or absence of the qualities being considered. This may mean that recommendations as usually written are not highly reliable and may confirm, to some extent, the general attitude often held toward them by men and women of the profession.

There is in the above conclusion a strong argument in favor of the careful devising of forms to be used in collecting data concerning the ability of teachers. Such forms would undoubtedly decrease the present variability.

From a study of the arrangement of the three groups of qualities (personal, social, and professional) on the basis of percents derived previously in this study, it is evident that the writers stress the social and professional qualities of experienced teachers, but that in recommending inexperienced candidates they stress personal qualities. A close study of the data shows that with but four exceptions social qualities is ranked as having first importance. Two of these exceptions occur in the case of Group E when recommending Juniors and Sophomores, and the other two in the case of Group S when recommending experienced Seniors and Juniors. As to inexperienced candidates, personal qualities is ranked most consistently as second in importance, and professional third. For the experienced candidates, however, professional qualities is ranked second in importance, and "personal" is ranked third. The change in rank

is easily understood when it is recalled that for inexperienced candidates the quality professional success is a negligible factor, but in the case of experienced candidates, it occupies a position high in rank.

The emphasis given social qualities by all groups of writers throws light upon the general problem of teacher training. Those phases of teaching ability which pertain to scholarship and professional training are usually considered most important in the success of a teacher. As a result of this, courses for teachers are organized to give these two types of training. In contrast to this, the results of the present investigation indicate that all writers of recommendations place social qualities above the professional qualities in importance. This can only mean that as the development of the social qualities is very important in the training of teachers, the development of courses in social leadership is a problem for all teacher-training institutions.

The results of this study suggest five considerations of importance for educational procedure: (1) the value of recommendations varies with the point of view and training of those who write them; (2) great care should be exercised in the formulation of rating sheets for collecting data concerning the ability of teachers; (3) such forms should fit the point of view and training of those who make use of them; (4) the value of recommendations depends in a measure upon the amount of detail recorded; and (5) all writers of recommendations place large emphasis upon the social qualities of teachers.

THE EFFECT OF POPULATION UPON ABILITY TO SUPPORT EDUCATION

HAROLD F. CLARK
Indiana University

In the *Atlantic Monthly* for February, 1925, Dr. Louis I. Dublin said:

> If in the course of time the population is reduced to a stationary state the proportion of persons over sixty-five years of age will be 10.5 percent. We are thus confronted with a vicious circle, for the greater the burden (supporting the old people) placed on young people, the fewer will be their children and this will mean still fewer young people at the reproductive period in the next generation.

The author of this article seems to be assuming that old people are a burden but that children support themselves. He is neglecting the cost of rearing a child and especially the cost of educating him. Perhaps this is not surprising, as school men have failed to consider the effect of a large number of children upon the ability of a community to supply education to each child. Without doubt the number of children is one of the most important factors in determining the amount of education that is going to be offered to the children of any community.

The large differences among communities, in the number of children, will show how this may be true.[2] Some communities have four times as many children as other communities of the same population. Entire states have more than twice as many children per thousand people as other states. South Carolina has .86 of an adult per child, California 2.09. If each adult in California paid for as much education as each adult in South Carolina each child in California would get 2.4 times as much education as each child in South Carolina.

One of the very important reasons that some sections of the country have better schools than other sections is that they have

[1] See p. 190, also a summary of an article in *Journal of the American Statistical Association*, March, 1925.

[2] A more complete discussion of some of the points raised in this paper will be found in a pamphlet published under this title by the Bureau of Educational Research, Indiana University.

fewer children to educate. This is also true as between rural and urban sections. It is not uncommon to find from one-fifth to one-third more children per thousand people in the rural than in the urban sections of the same state. A larger percent of children necessarily makes a smaller percent of adults in the major productive age groups. Two cities may have the same population and yet one may have twice as many children as the other. Differences almost this large will be found among some of the larger cities. Newark, New Jersey, has 1.5 adults to each child; San Francisco has more than 2.5.

If one community had twice as many children as another, assuming equal ability in other respects, the first community would be able to provide only half as much education for each child as the second community. This will probably be accepted as self-evident; that if one community has to divide education among twice as many children as another community, each child is going to get only half as much. The result is due to dividing up the education that is available. Unfortunately this is not the only factor working to reduce the amount of education for each child. In the community that has twice as many children as the other the additional children must be fed and clothed. As an illustration let us assume that there are four children per family in the first community and two children per family in the second community. Feeding and clothing the two additional children in the first community will use an amount of money equivalent to the education of one of the children in the second community. This will leave in the first community only half as much money for education, to educate twice as many children. The result is that doubling the number of children reduces to one-fourth the education that can be supplied to each child.

Some of the reasons for this are: (1) that the additional children have to be fed and clothed, (2) that a larger percent of children makes a larger percent of non-producing people, (3) that a larger percent of children makes a smaller percent of people in the most productive ages, (4) that in a community having a small number of children savings will be larger and

this will soon have a cumulative effect, and (5) that the better training provided will increase efficiency and production and have a large cumulative effect. This would seem to indicate that the number of children and ability to support schools do not vary in a direct ratio. A much larger investigation than can be reported here shows this to be true. The fact above, that doubling the number of children reduces to one-fourth rather than one-half the education that can be supplied to each child, would suggest that ability varies inversely as the square of the number, which turns out to be a fair statement of the facts.

The situation may be illustrated by two communities. Community A has 2 adults to each child,[3] and Community B has 1 adult to each child. The ability of the communities to support education is not 2 to 1 but as the square of the number, or 4 to 1. The ratio of 2 adults to 1 child is approximately the ratio found in a stable population. Accepting this as a standard, the ability of any community may be determined by comparison with it. The ratio of adults to children in the standard community is 2, the 2 squared is 4. The ratio of adults to children in any community, squared and compared with 4, will give the ability of that community to support education as determined by the number of children.

Two illustrations will make clear the process:

Case I—
Gary has 1.5 adults to each child
$$1.5^2 = 2.25$$
Compared with the standard Gary is 2.25 of 4
or
$$\frac{2.25}{4} \text{ of the standard.}$$

Case II—
Indianapolis has approximately 2 adults to each child
$$2^2 = 4$$
Compared with the standard 4, Indianapolis is
$$4 \text{ to } 4 \text{ or } \frac{4}{4} \text{ of the standard.}$$

The process may be summarized as follows: the formula is

$$\frac{X^2}{4}.$$

[3] Any other number may be taken and it will work out the same way.

The steps in its computation are:

1. Get the number of adults to each child in the community you are studying.
2. The "standard" ratio of adults to children is $\frac{2}{1}$.
3. Because the square of the number is a better indication of the manner in which differences in population affect the ability to support schools, the 2 is squared, making 4.
4. Four (4) becomes the unit of comparison or measurement which may be called the "standard ability unit" (S.A.U.).
5. The ratio obtained in Step 1 is squared and compared with 4.
6. The effect of the ratio of adults to children upon ability to support schools is measured by this standard ability unit.

The ratio obtained by the above process may be multiplied by the per capita wealth of a community to obtain a composite measure of ability to support schools.

In summary, it appears that there are large variations among communities in the ratio of adults to children. These differences have very decided effects on ability to support schools. A change from the standard in the ratio of adults to children affects the ability as the square of that change.

A formula has been devised which will measure this change. The formula is

$$\frac{X^2}{4}$$

when X equals the ratio of adults to children in the community. This formula may also be applied to states or any smaller unit of population to measure the ability of that community to supply education to each child.

THE PRINCIPLE OF THE NOMOGRAPH IN EDUCATION

JOHN C. ALMACK
Stanford University
AND
WILLIAM G. CARR
Stanford University

The early history of short cuts in calculation has been well summarized by Maurice d'Ocagne, the original discoverer of the nomogram (*7*:147-53).[1] From him we learn that modern occidental methods of simplified calculation began with the work of John Napier, the inventor of logarithms, who published in 1614 his book on the use of the device commonly called "Napier's bones." A few years later, Edmund Gunter followed Napier's invention by devising the logarithmic scale for computing areas, heights, and volumes. In 1637, René Descartes published *La Géometrie,* in which he showed the possibility of representing algebraic functions by curves. To him we owe the commonly used system of coordinate chart.

Later development continued in the hands of the French. Pouchet in his *Arithmétique Linéaire* (Rouen, 1795) prepared the way for modern nomography by designing scales with double graduations. By 1840 his method had been considerably extended by French engineers and applied particularly in military science and economics. The theoretical basis of nomography was decidedly furthered by Leon Lalanne, who, in 1842-43 proposed the theory of anamorphosis, that is, the variation of the axes and their graduation in Cartesian coordinates so as to bring the curve of any equation to the form of a straight line.[2] The general application of this principle was worked out by the engineer Massau in his *Mémoire sur l'Intégration Graphique et ses Applications.*[3]

The same year (1884) that Massau brought out his *Mémoire* was marked by the publication of d'Ocagne's idea of using col-

[1] Figures in parentheses refer to the bibliography at the end of the article.
[2] *Comptes Rendu de l'Academie,* 2e sem., 1843, p. 492.
[3] *See* t. III, chap. 2, sec. 2.

linear points, followed a few years later (1891) by *Les Calculs Usuels Effectues au Moyens de Abaques.* Here the word nomography was first used. The works of this author are regarded today as the most authoritative on the subject. American and British engineers have contributed considerably to the application of the science, but the literature is to be found mainly in French and

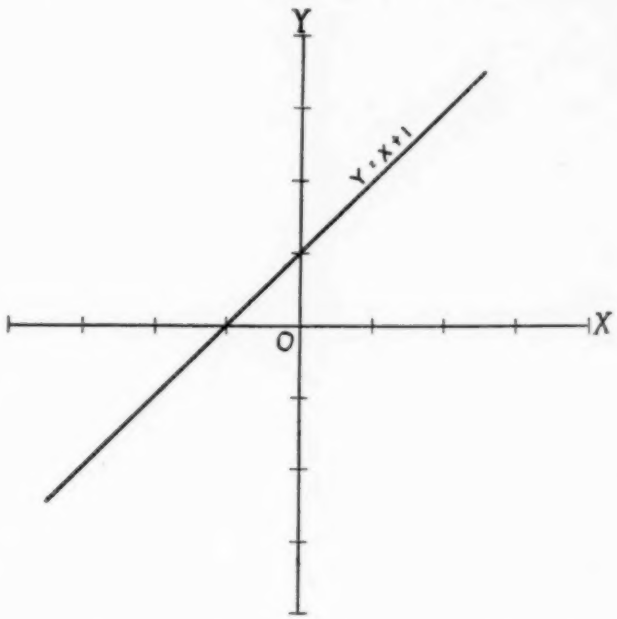

FIGURE 1. A COORDINATE CHART REPRESENTING A SIMPLE FORMULA

German. The device has been used most extensively in engineering in facilitating calculations in engine design, hydraulics, pneumatics, specific heat and specific volume of steam, induction motors, illumination, navigation, marine engineering, strength of materials, stresses and strains, and the determination of areas and volumes. Very few applications have ever been made to the social sciences; practically none, to education.

The term "nomograph" may be readily defined etymologically. It is derived from the Greek, *nomos,* a law, and *graphos,* a writing or representation. In its most general terms, then, a nomograph is a way of representing a law. In the place of nomograph, the term nomogram is often used as being more

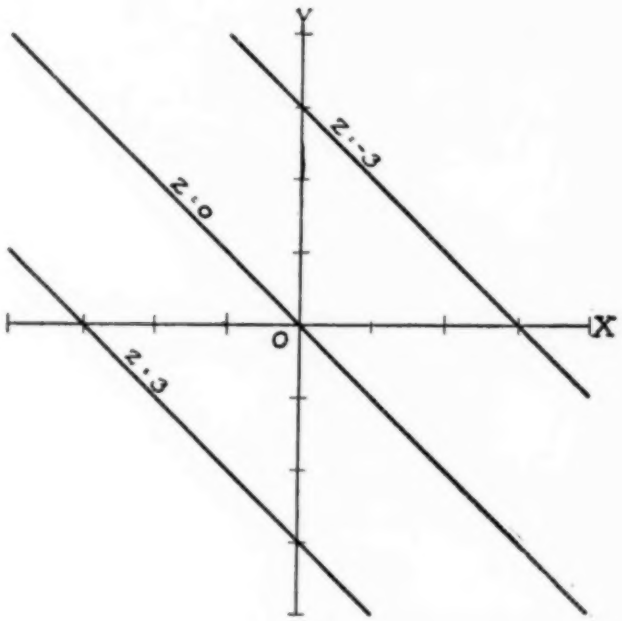

FIGURE 2. A COORDINATE CHART REPRESENTING THREE VARIABLES

truly indicative of its function. Marshall, however, prefers nomograph, which he defines as (5:169) "a graph composed of lines scaled relatively and placed in such relative positions that the values of the variables are found on a line crossing the scales."

Its meaning can be illustrated in a simple way by means of a coordinate chart. Thus if we take a pair of axes OX and OY at right angles and plot values of x as abscissae and values of

$x+1$ as ordinates and connect the points thus obtained, we get a straight line which might be called a nomograph, for it is a drawing representing the law or equation,

$$y=x+1.$$

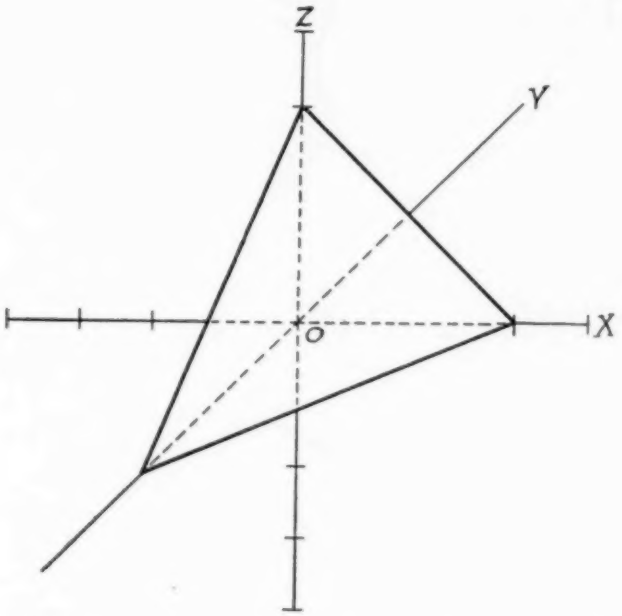

FIGURE 3. THREE VARIABLES ON A THREE DIMENSION CHART

Suppose now we take an equation with three variables instead of two: for example,

$$x+y+z=0.$$

The common Cartesian coordinate system of axes is not adequate to represent this equation as was done in Figure 1. Some other method must be found for overcoming the difficulty. One solution would be to draw several curves for

$$x+y=-z,$$

one curve for each convenient or useful value of z shown in

Figure 2. Or, since only three variables are involved, we might erect a z-axis perpendicular to the plane xy. The graph which results is a surface such as is represented in perspective in Figure 3.

Both of these methods, however, are open to grave objections. The first works well enough when there are only a few values of z to be considered, but if z be any value then the number of curves which must be drawn is infinite. The solid model which follows from the three dimensional figure is not easy to construct and is cumbersome to use. There is need, consequently, for a device by which an equation of the type

$$x + y + z = 0$$

may be represented without recourse to a system of axes with a common origin. The nomograph meets this need and is applicable to many other type equations. Its values may be summarized as follows:

1. It makes easily possible the plotting of three or more variables.
2. It gives a permanent solution for a formula and can be used at any time by simply reading the scale, while in graphical statistics a separate diagram is necessary for every solution.
3. It is more convenient to construct and read than the coordinate diagram.
4. It serves as a useful check upon other methods of calculation.
5. It has as high a degree of reliability as the usual four-place slide rule.

As the nomographic device is relatively new, it is not certain that all of its possible types have been devised. Lipka gives ten main forms, each of which can be modified in a number of ways, thus increasing the number of applications. For example, it is obvious that if a nomograph will serve in the addition of numbers, it will do as well in the reverse process, subtraction; if it can be employed in multiplying, it is equally useful in division. The equations which follow can be conveniently expressed in nomographic form, but the first is so simple as to have little worth in making calculations. Such simple types are cited because they can be advantageously employed in showing how the nomograph is constructed. The types are:

$$A + B = X \quad \ldots\ldots (1)$$

$$AB = X$$

$$A + B + C + \ldots = X \quad \ldots\ldots (2)$$

$$AB = CX$$

$$A = BX \text{ or } A = B^x \quad \ldots\ldots (3)$$

$$\frac{A}{B} = \frac{C}{X} \quad \ldots\ldots (4)$$

$$ABC = X \quad \ldots\ldots (5)$$

$$A : B :: C : X \quad \ldots\ldots (6)$$

$$A - B = C - X \quad \ldots\ldots (7)$$

$$A + B = \frac{C}{X} \quad \ldots\ldots (8)$$

$$\frac{1}{A} + \frac{1}{B} = \frac{1}{X} \quad \ldots\ldots (9)$$

$$\frac{1}{A} + \frac{1}{B} + \frac{1}{C} + \ldots = \frac{1}{X}$$

$$(A + B)\, C = X \quad \ldots\ldots (10)$$

The meaning of the nomograph can best be seen by describing the process of construction. Let us first take one of the form

$$A + B = X.$$

The object is to make a chart which will represent this formula graphically so that if we are given any two of the three terms, the third may be read off without solving the equation. In practice, one would of course solve so simple an equation by ordinary addition performed mentally, but it serves as a good type for illustrative purposes. Instead of trying to represent the equation with a diagram of the kinds given in Figures 2 and 3, there should be constructed three parallel equidistant scales A, X, and B of any convenient length, with their zeros collinear as in the diagram shown in Figure 4.

Scale A is first graduated with any convenient unit for both positive and negative numbers. Next, scale B is laid off at any convenient distance from A and is graduated with the same unit. As a last step, scale X is laid off midway between A and B and graduated with a unit equal to half the A-unit. Now a line determined by a point on A and a point on B will intersect scale X at the graduation $A + B$. In actual practice with nomographs it is not necessary to draw this line. A transparent straight-edge, or better, a strip of celluloid, with a hair-line ruled upon

it, will enable one to make the computation without disfiguring the nomograph. The proof of the validity of the nomograph to perform the operation indicated by the equation belongs to plane

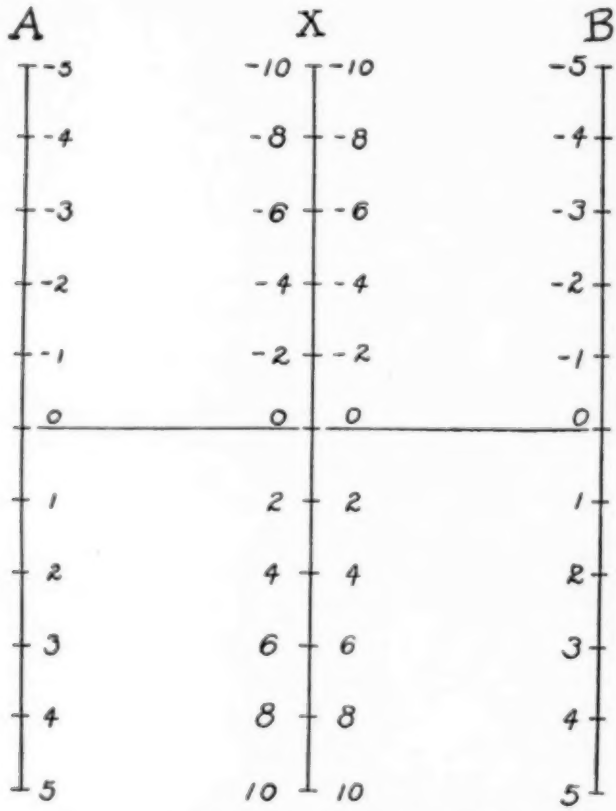

FIGURE 4. A SIMPLE NOMOGRAPH OF THE EQUATION $A + B = X$

geometry. This proof, together with rules for constructing the many types of nomographs is given by Brodetsky (1) and others listed in the bibliography inserted at the end of this article.

There is one other property of the simple nomograph of Figure 4 which is important. If the given equation had been of the type

$$AB = X$$

instead of the type

$$A + B = X,$$

we could have written for

$$AB = X, \log A + \log B = \log X.$$

The nomograph for

$$AB = X$$

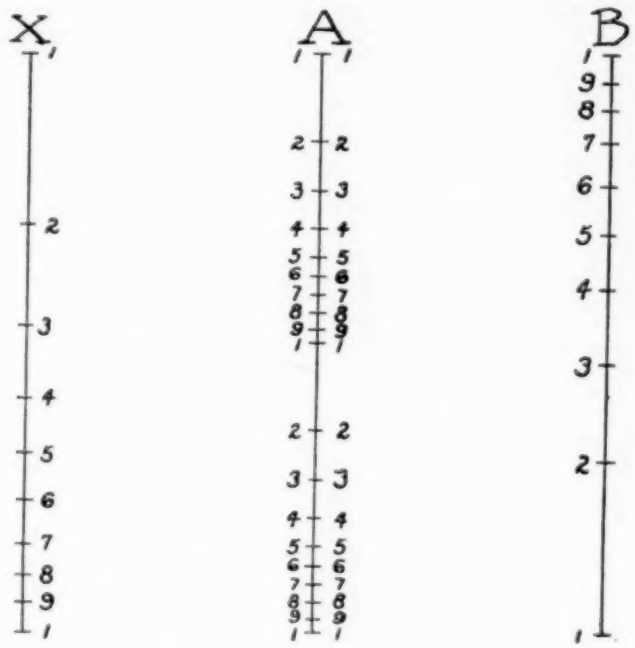

FIGURE 5. A NOMOGRAPH OF THE EQUATION $AB = X$

is therefore the same as the nomograph for

$$A + B = X$$

except that the scales are graduated logarithmically in a manner comparable to the ordinary slide rule. The change has been effected in Figure 5, which is accordingly a nomograph for

$$AB = X.$$

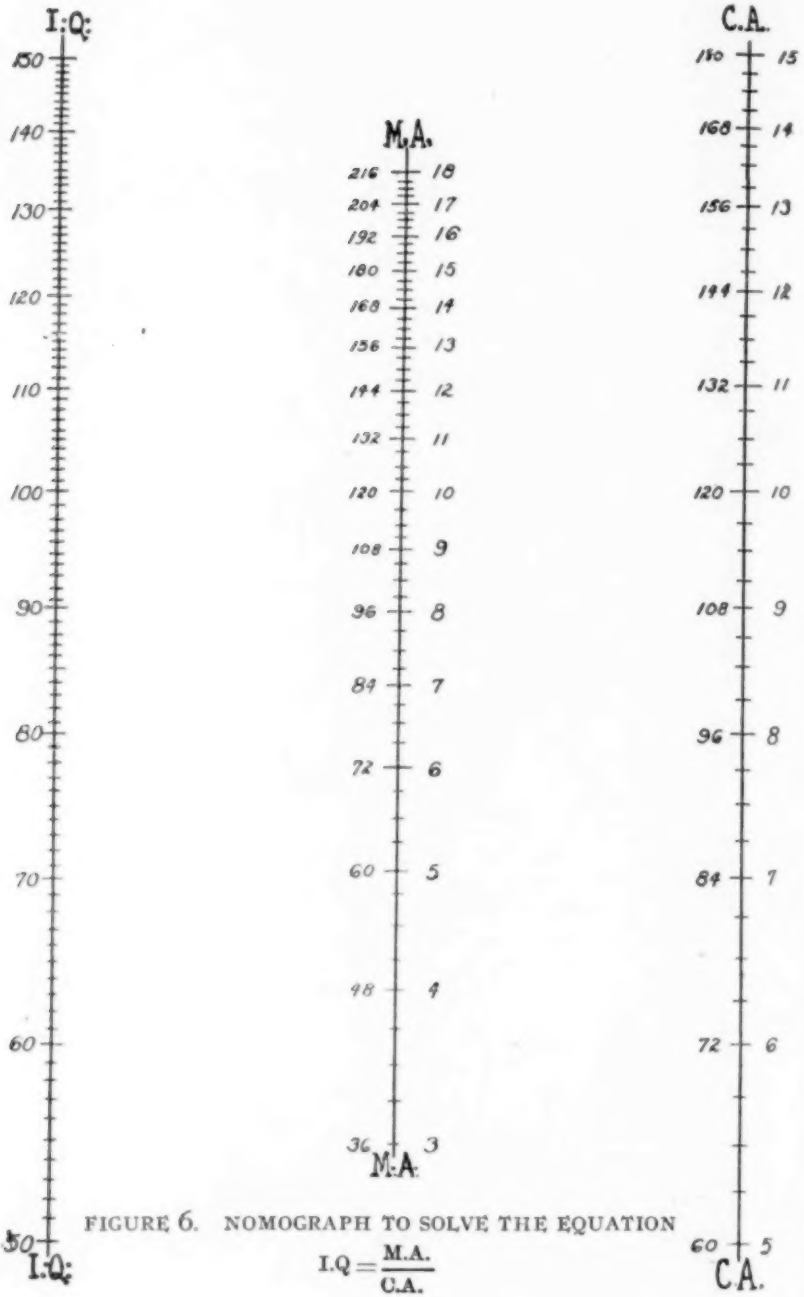

FIGURE 6. NOMOGRAPH TO SOLVE THE EQUATION

$$\text{I.Q} = \frac{\text{M.A.}}{\text{C.A.}}$$

The nomograph shown in Figure 5 will of course also solve the equation

$$\frac{X}{A} = B.$$

This is the type of calculation that is made every time one computes an intelligence quotient from the formula

$$\frac{\text{M.A.}}{\text{C.A.}} = I.Q.$$

If we take the common useful values of M. A. (mental age), C. A. (chronological age), and I. Q. (intelligence quotient), and expand the scales so as to permit of finer graduations, the result is a nomograph like that given in Figure 6. The position of the scales has been altered so as to place the quotient on the left side of the sheet. The M. A. and C. A. scales are graduated both in years and in months. This chart will also compute the educational quotient from the E. A. (educational age) and the C. A. (chronological age). In such group tests as that devised by Professor Terman where the test score is transposed into a mental age by the use of a table, it would be useful to graduate one side of the scale in terms of the test score.

A very useful nomograph for predicting the population growth of a city, state, or other area is given in Figure 7. In the large school districts, this device may be employed in forecasting growth or in measuring past rate of increase without further checks, but where the population is small, it has value mainly as a check upon actual calculations. The type formula employed is

$$ABC = X$$

in which

A = number of years for which estimate is made
B = absolute population
X = absolute increase
C = rate of increase for year

To illustrate its use, let us assume two situations:

1. Given the population of a school district ten years ago, and its increase for ten years, to find the rate of increase each year.
2. Given the population of a school district today, and its rate of increase per year for the preceding ten years, to find what the absolute increase will be in ten years.

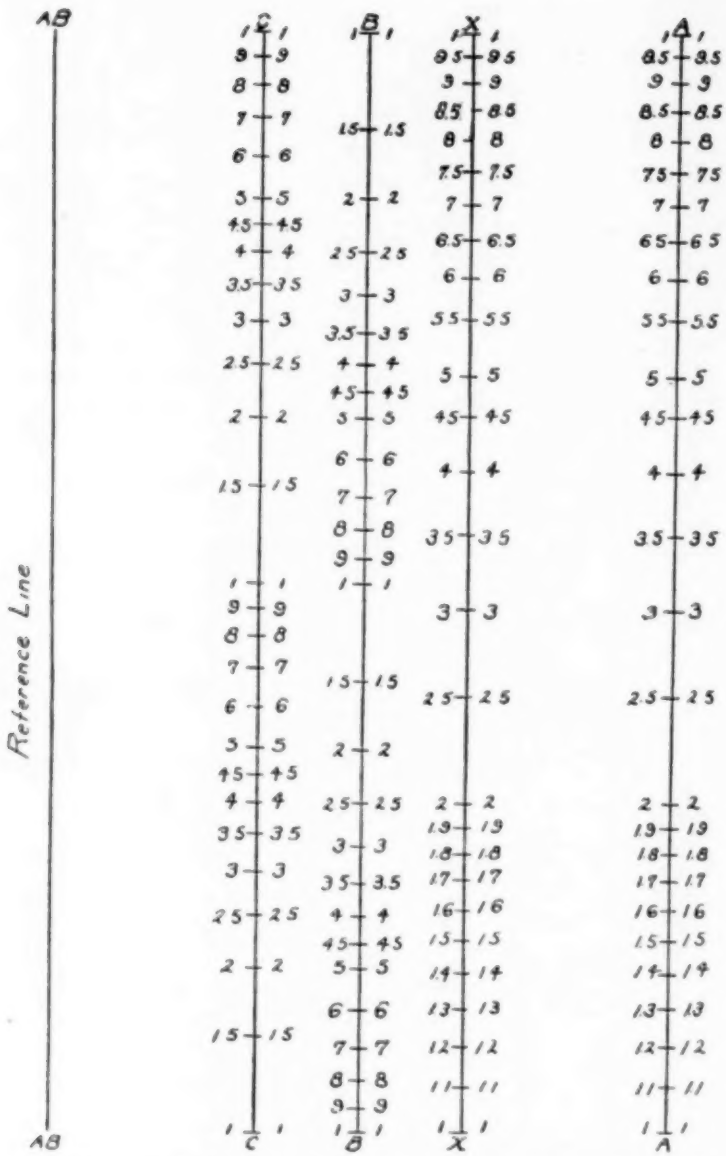

FIGURE 7. CHART FOR PREDICTING SCHOOL POPULATION
$X = ABC$

Taking the first situation, we have

A = ten years
B = 6,000 (Illustrative only)
X = 1,500 (Illustrative only)

Problem: to find C, the rate of increase, when a population of 6,000 increases by 1,500 in 10 years.

The solution is as follows: Line up 10 on the A scale with 6,000 on the B scale, noting the point where the line AB cuts the Reference Line. Call this point o. Next, turn the straight edge until point o on the Reference Line is in a straight line with 1,500 on scale X, and read off the answer on scale C. This is the estimated rate of increase per year. In the second situation the process is the same, except that point o is lined up with scale C and the answer read off of scale X.

Estimates may be made in any multiple of ten. A finer graduation than is shown on the scales would make for greater accuracy and save having to interpolate, though with reasonable care in making alignments, answers can be read accurately enough for checking purposes as the nomograph stands.

As a final example of the nomograph in education, a problem has been chosen that often occurs in surveys. The experts engaged in such work usually find it advisable to make a statement concerning the district's needs, its educational performance, and its needs and performance relative to ability. The letters N, A, and P will be used to represent these variables. When any two of the variables are known the nomograph in Figure 8 will solve the equation:

$$P^2 = .815\,NA$$

N = needs
A = ability
P = performance.

While the derivation of the formula will be explained, it is not the intention to defend the factors which have been finally selected as representing ability, needs, and performance. It is realized that there are many other facts of importance, and it is conceded that they may be of more significance. Those which have been applied in the formula given will serve to illustrate another form of nomograph and will furnish an index that should have a measure of validity. Some of the limitations will be noted as we proceed.

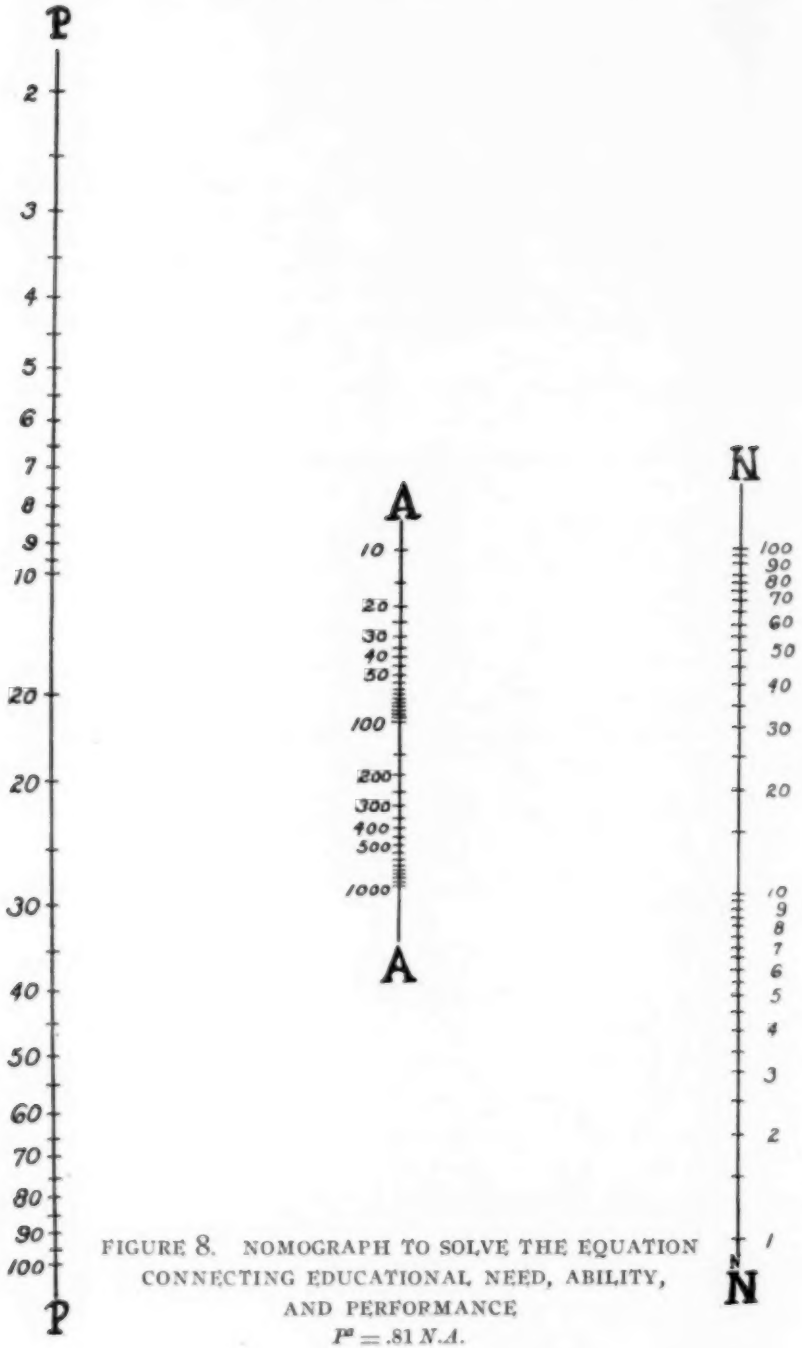

FIGURE 8. NOMOGRAPH TO SOLVE THE EQUATION CONNECTING EDUCATIONAL NEED, ABILITY, AND PERFORMANCE

$P^a = .81\,N.A.$

It is evident that a nomograph cannot be constructed unless one knows the equation which it is to solve. In all but one of the examples thus far presented (Figure 7), the equation has been given. In the present case it is necessary to determine the law which governs the changes in the variables before proceeding to construct the chart. The first step is to decide upon the factors to be used. After an experimental study of elements entering into needs, ability, and performance, the following were chosen as satisfactory for the purpose in mind:

1. Needs = number of children of school age expressed in thousands; that is, between 5 and 19.
2. Ability = dollars of true wealth.
3. Performance = all expenditures for education.

That these are imperfect measures is readily admitted. Consider the first, for example. It tells nothing about the types of children who are to be educated. Their race, intelligence, homogeneity, and heterogeneity are left out of consideration. Very likely differences in many qualities cause variation in the actual felt need for education. It would have been possible to take some account of such elements as we have mentioned, but in the preliminary attack on the problem, further refinement was not thought necessary. All in all, the number of children for whom a school district is morally and legally obligated to provide schooling is doubtless the best single measure of educational needs which can be applied throughout the country. Certain disadvantages and merits of the other factors could also be enumerated.

The equation,

$$P^2 = .815\,NA$$

then means that on the average the cities of the United States spend such an amount on education that the square of this amount is equal to .815 times the product of the need and ability when they are expressed in the terms indicated. With the factors determined upon, the required data were collected and assembled in a table. The next step was to derive the equation connecting the variables A, N, and P. Of the many

methods tried out, it appeared that the one which consisted in a simple averaging of results was most satisfactory. The average ratio between A and P was found to be 82.6.

This may be written

$$A = 82.6P \text{ or } P = \frac{A}{82.6}.$$

The average ratio between P and N is 67.2, or

$$P = 67.2N.$$

Multiplying both sides of the last equation by P we have

$$P^2 = 67.2NP.$$

Substituting in the right member the value of P in terms of A from above we have

$$P^2 = \frac{67.2}{82.6}NA \text{ or } P^2 = .815\ NA.$$

It is to solve this equation that the nomograph in Figure 8 has been constructed.

As an illustration of its use, let us take the case of Birmingham, Alabama, which happens to be the first city on the alphabetical list. The N is 51,000; the A is $354,000,000. A line passing through these points determines a point on scale P which represents the average performance throughout the country under conditions of need and ability such as exist in Birmingham. This point is approximately $3,900,000, but the actual P in Birmingham is $1,575,000, which is less than one-half what the city would have to spend on schools if it is to come up to the nation-wide mean, after making due allowance for its ability and need.

There is one other matter which ought to be discussed before the paper is concluded. How accurately does the derived equation represent the true facts? It is understood that variations in the liberality with which schools are supported are great. What we are working with here is the average. Conclusions can therefore be drawn only as they relate to that average. In the physical sciences, an equation is made by considering every observation of equal value if made under equally favorable conditions. If averages are taken, they are computed for successive

observations of phenomena. The difficulty of working in the social sciences is due to the fact that no phenomenon ever recurs. If averages are taken, the investigator must average things not exactly in the same class. There are no two cities with exactly the same need or the same ability to support schools. This is precisely the problem that faces the school surveyor when he attempts to compare the subject city with others. No city exactly similar can ever be found. The method that has been stated here is a means of comparing one city with all others by taking account of these variations.

Bibliography

There is an extensive and rapidly growing literature on the nomograph, most of it being in French and German. However, of late years articles have been appearing in England and the United States, most of them bearing on the application of the nomograph to engineering. The short list which follows presents basic principles.

1. Brodetsky, S. *A First Course in Nomography.* London, Bell and Sons, 1920.
The only introductory textbook in English on the subject. Clearly written, contains specific rules and suggestions.
2. Feldman, W. M. *Biomathematics.* London, Charles Griffin and Company, 1923. pp. 118-26.
A good analysis of methods of determining scale moduli.
3. Haskell, Allan C. *How to Make and Use Graphic Charts.* New York, Codex Book Company, 1919. Chap. VIII.
A clear step-by-step exposition of the method of constructing a nomograph.
4. Lipka, Joseph. *Mechanical and Graphical Computation.* New York, John Wiley and Sons, 1918.
A very useful working handbook. Thorough treatment of types; also very good on the derivation of empirical formulas.
5. Marshal, William C. *Graphical Methods.* New York, McGraw Hill Book Company, 1921.
Follows Lipka in presenting types.
6. d'Ocagne, M. *Calcul Graphique et Nomographie.* Paris, Octave Doin, editeur, 1908.
A theoretical discussion of the mathematical principles involved in the construction of nomographs. Contains a bibliography of about one hundred titles, most of them in French and German.
7. d'Ocagne, M. *Le Calcul Simplifie par les Procedes Mecaniques et Graphiques.* Paris, Gauthier Villars, 1905.
The pioneer work in the field of nomography. Probably the proper starting point for the study of the subject from the mathematical side.
8. Peddle, John B. *The Construction of Graphical Charts.* New York, McGraw Hill Book Company, 1919. Chaps. II and III.
A reasonably full treatment of nomographs is to be found in these chapters from the point of view of the engineer.

THE BASIC CONCEPTS IN CONTEMPORARY LIFE

H. MELTZER
Oregon State Agricultural College

The present tendency in the construction of social-science curricula is clearly toward the use of objective methods. Such methods have been applied in studies attempting to determine the basic facts of contemporary life, modern problems, and current questions. A brief summary of some of the methods employed and some of the results found are given in Part II of the *Twenty-second Yearbook of the National Society for the Study of Education.* Findings complementary to these, from the point of view of the curriculum-maker, are reported in this study in which an attempt is made to determine, in order of importance, a list of the basic social, political, and economic concepts of contemporary life.

The list of concepts was determined by a count-study of selected readings in which frequency of distribution as well as frequency of occurrence was considered. The materials were selected from two sources: critical magazines representing radical, liberal, and conservative attitudes toward industrial, political, and social problems, and four books by "frontier thinkers."

Issues of magazine studied.—The magazines selected were critical weeklies: *New Republic, Outlook, Living Age,* and *Manchester Guardian Weekly.* The original intention was to supplement these weekly magazines with monthly magazines such as *Our World* and *The International Interpreter,* but lack of time prohibited this.[1]

The weekly magazines were studied according to two separate groupings: (1) the issues distributed over a period of four years from 1919 through 1922, as shown in Table I, and (2) the issues for the year 1923. The magazines during the one year were examined every month according to the following plan:

[1] We wish here to emphasize the fact that the reading made for this study is not a complete sampling. Hence, the Social-Science Group of the Lincoln School has it in mind to extend this study.

first week, *New Republic;* second week, *Outlook;* third week, *Living Age;* fourth week, *Manchester Guardian Weekly.* The former group, as classified in Table I, includes four issues of each magazine every year, or sixteen issues for the four years, sixty-four in all. In the latter there is one issue of each magazine every month, or twelve for the year, totaling forty-eight issues. Thus, under the two groups 112 issues of magazines were examined. Editorials and special articles comprised the material studied — advertisements, book reviews, and letters to the editor were omitted.

TABLE I. DISTRIBUTION OF THE ISSUES OF THE MAGAZINES STUDIED

Names of Magazines	Number of Issues in Each Month	Months	Inclusive Dates
(1)	(2)	(3)	(4)
New Republic	First	January, April, July, October	1–7
Outlook	Second	February, May, August, November	8–14
Living Age	Third	March, June, September, December	15–21
Manchester Guardian Weekly	Fourth	January, May, September, April	22–29

The purpose in the selection of the distribution of issues under both groups was to obtain representative samplings and to avoid biased data resulting from an overemphasis of seasonal or transitory items or from the prejudices of a one-man or a one-paper point of view. In the distribution under the first classification, tabulated in Table I, every month of the four-year period is covered by at least one magazine; in the distribution under the second classification, every week of the one-year period is covered by one of the four magazines studied. Further to assure avoidance of overemphasis of seasonal influence, a count

was made not only of the number of mentions but also of the number of issues. The weighting of both of these factors is described later.

Selection of books.—Because of a lack of available time to study representative samplings of books from the various fields of interest, the intention was to select a small number of general and inclusive books. The four books selected were: *The Great Society,* by Graham Wallas,[2] which gives a psychological treatment of political and social problems; *Introduction to World*

NEW REPUBLIC—1919

Name of Concept	January 4	April 5	July 2	October 1	Mentions	Number of Issues
Democracy	||||| ||||| ||||| ||||| ||||| |||	|||||	||||| |		39	4

FIGURE 1

Politics, by Herbert Adams Gibbons,[3] a book that treats briefly but inclusively of international relations; *The New Democracy,* by Walter Edward Weyl,[4] which stresses industrial relations in a democracy; and *America Faces the Future,* by Durant Drake,[5] which deals with contemporary problems and is the most general of the four books.

Description of Procedure

The original intention was to make a count-study of cue concepts, such as "an interdependent world," "democracy," "industrial revolution," "big business," and "standard of living," which were to be used as touchstones for selection. Our list contains all the cue concepts found in the reading, as well as some more particular concepts, for example, "League of Nations," "Treaty of Versailles," and the like.

[2] New York, Macmillan Company, 1924.
[3] New York, Century Company, 1922.
[4] New York, Macmillan Company, 1922.
[5] New York, Macmillan Company, 1922.

TABLE II. CONCEPTS IN ORDER OF IMPORTANCE

Name of Concept	Weighted Rank	Total Number of Mentions	Name of Concept	Weighted Rank	Total Number of Mentions
(1)	(2)	(3)	(4)	(5)	(6)
Industry (British steel)	1	492	Soviet (Russian Republicism)	41	432
International question	2	399	Big business	42	82
Democracy	3	624	Capitalist (captain of industry)	43	79
Public opinion	4	316	Immigration	44	107
League of Nations	5	951	Neutrality	45	89
Socialist	6	343	Industrial region (distributing center)	46	71
Prime minister (premier)	7	513	Wage earner	47	83
Conservative	8	299	Great Powers (World)	48	99
Democratic	9	361	Rehabilitation / Recovery / Restoration } Europe	49	141
Trade	10	224	Nationalism	50	104
Treaty of Versailles	11	265	Reactionary	51	80
Strike	12	299	Economic (expansion, interests, etc.)	52	135
Socialism	13	206	Nationalization	53	115
Republican Party	14	290	Liberal	54	194
Communistic	15	285	Bolshevism	55	150
Diplomat-ic-ist	16	157	Patriotic	56	65
National interests	17	277	Washington Conference	57	134
Imperialism	18	139	Trade union	58	79
Industrial affairs (problems, questions, etc.)	19.5	143	Near East question	59	111
International relations	19.5	143	Labor union	60	82
Radical	21	115	Aristocracy	61	58
Employment problem	22	252	Industrial movement (breakdown progress)	62	62
Monopoly	23.5	137	Export	63	90
Patriotism	23.5	97	Anarchy	64	54
Nationalist	25	204	Proletarian	65	76
Democratic Party	26	194	Tariff	66	66
Imperialist-ic-s	27	105	Americanism	67	74
Diplomacy	28	158	Prohibition	68	122
Bolshevist-iki	29	315	Rights (speech, assemblage, etc.)	69	88
Liberal-s Party	30	245	Trust (steel, etc.)	70	88
Progressive	31	137	Militarism	71	80
Public affairs	32	131	Secret negotiations (diplomacy, treaties)	72	69
Ministry	33	191	Industrialism	73	55
Reparation	34	481	World market	74	52
Revolutionist	35	161			
Exploitation (newly discovered, industrial regions)	36	97			
Standard of living	37	95			
Indemnities	38	136			
Monarchy	39	96			
Labor Party	40	319			

TABLE II (*Continued*).

Name of Concept	Weighted Rank	Total Number of Mentions	Name of Concept	Weighted Rank	Total Number of Mentions
(1)	(2)	(3)	(4)	(5)	(6)
Constitutional government	75	55	Militarist	111	44
Industrial war (disputes, conflicts, unrest)	76	48	International-ization, (-ism, results)	112	40
Autocratic	77	49	Government ownership	113	31
Capitalism (capitalistic order)	78	90	Industrial waste	114.5	38
Protection policy	79.5	93	Passive resistance	114.5	79
Vested interests	79.5	50	Agricultural region	116	20
Individualism	81	113	Industrial ills	117	24
Anarchists	82	53	Representative government	118	29
Industrial control	83	54	Free trade	119	47
Commercialism in (power, penetration, expansion)	84.5	51	Class war	120	45
Liberalism	84.5	109	Socialization	121	72
Trade unionism	86	65	Exploitation (economic by capitalist)	122	25
Personal liberties	87	71	Conservatism	123	23
Ruhr (seizure, occupation, situation)	88	422	Demobilization	124	40
Industrial resources	89	49	Lausanne Conference	125.5	77
Organized working class	90	43	Middle Ages	125.5	28
Sectionalism-regionalism	91	76	Syndicalism	127	29
Colonial (expansion, power, colonies)	92	131	Industrialist	128	7
Industrial relations	93	45	Interdependence	129	18
Conservation Natural Resources	94	58	Open shop	130	47
Foreign minister	95	59	Christianity	131	38
Radicalism	96	50	Oligarchy	132	31
Monroe Doctrine	97	44	Collective bargaining	133	33
International cooperation	98	34	Bureaucrat	134	27
Autocracy	99	39	Specialization	135	19
Industrial democracy	100	40	Plutocracy	136	199
Foreign trade	101	55	Communism	137	29
Standardization	102	42	Backward people	138.5	22
Americanization	103	40	Neutralization	138.5	22
Balance of power	104	32	Pacifism	140	20
Isolation	105	32	Natural resources	141.5	30
Industrial state	106	20	Protectorate	141.5	55
Frontier questions	107	103	Neutral state	143	32
Party government	108	29	Open-door policy	144	16
Pioneer	109	49	Centralization	145	18
Industrial stability	110	38	Transportation	146	47
			Political corruption	147	51
			Sabotage	148	17
			Bureaucracy	149	25

TABLE II (*Continued*).

Name of Concept	Weighted Rank	Total Number of Mentions	Name of Concept	Weighted Rank	Total Number of Mentions
(1)	(2)	(3)	(4)	(5)	(6)
Zionism	150	41	Consent of governed	187	8
Competitive system	151	48	Wages system	188	7
Bourgeois system	152	23	Third party	189	13
Pan-Americanism	153	21			
Irreconcilables	154	7	States' rights, sovereignty	190	9
			Equality before law	191	15
Medievalism	155	13	Feudalism	192	7
Europeanizing (western-izing)	156	27	Barbarism	193	9
Dictatorship	157	33	Evolution doctrine	194	15
I. W. W. (-ism)	158	25			
Commerce	159	24	Progressivism	195	10
			Concentration, business, central wealth	196	11
Agricultural depression	160	51	Balance of trade	197	8
Foreign policy	161	62	Proletarian dictatorship	198	12
European civilization	162	10	Prussianism	199	6
Small nationalities (weaker powers)	163	26	Academic freedom	200	8
Large scale production	164	14	Centralized government	201	7
			Ship subsidy	202	30
Monarchist's reactionaries	165	12	Industrial society	203	7
Despotism	166	16	Non-Partisian League	204	32
Syndicalist	167	23			
Colonization	168	71	Ambassador	205	14
Sphere of influence	169	38	Commercial blockade	206	9
			Traditionalized industry	207	5
Farm-labor coalition	170	23	Compulsory arbitration	208	5
Dependence on other nations' resources	171.5	11	Division of labor	209	9
Collectivism	171.5	11	Great society	210	70
Republicanism	173	14	Criminality	211	6
Materialism	174	12	Plebiscite	212	9
			Martial law	213	8
German industrialists	175	59	Modernism	214	8
Bonus	176	20			
Imports	177	12	Self-sufficing community	215	10
Paternalism	178	7	Union labor	216	6
Checks and balances in government check-rein	179	12	Outlawry of war	217	20
			Parliamentary government	218	10
Policy of compensation	180	27	Occidental Japanese exclusion	220	5
Inflated currency	181	12			
World politics	182	70	Economic determinism	220	5
Property rights cases	183	18	Fascisti	220	18
Fundamentalists	184	11	World relations	222	5
			Boycott	223	5
Chauvinism	185	10	Factory system	224	6
Industrial revolution	186	8			

TABLE II (*Continued*).

Name of Concept	Weighted Rank	Total Number of Mentions	Name of Concept	Weighted Rank	Total Number of Mentions
(1)	(2)	(3)	(4)	(5)	(6)
Factionalism	225	8	Economic imperialism	260	7
Capital levy	226	14	Weltpolitik policy	261	7
Creditor nation	227	4	Economic freedom	262	9
Debtor nation	228	4	Referendum	263.5	3
Filibustering	229	6	Individualistic organized industry	263.5	3
A. F. of L.	230	32			
Irredennt'st (ism-principle)	231	25	Tolerance	265	7
Primitive civilization	232.5	5	Social cooperation	267	6
Domestic affairs	232.5	2	Conquest of continent	267	6
Foreign affairs	234	10	"Fourteen Points"	267	6
			Open diplomacy	269	3
Lockout	236	3			
Home rule	236	3	Recall	272	5
Social obligation, responsibility	236	3	Public service corporation	272	5
			Westward movement	272	5
Social surplus	239	22	Seasonal industries	272	2
Migration	239	11	Period world discovery	272	5
Masses, common people	239	11	World commerce	277	2
"Stand-patters"	241	6	Gerrymandering	277	4
Economic self-sufficiency	242	3	Undeveloped resources	277	1
Bourbonism	243	4	Theocracy	277	2
Social revolutionaries	244	12	Spoils system	277	4
"Pork Barrel"	245	2	Expansionists	280	1
Labor movement	246.5	6	Center of trade	281	1
Trusteeship in colonial administration	246.5	6	Law and order	282	3
			Concentration population	284.5	1
Exploitation public ignorance	248	4	International arbitration	284.5	1
Minimum wage law	249	3	Political prisoners	284.5	1
			Divine right	284.5	1
Americanize America	250.5	3	Gentlemen's Agreement with Japan	287	1
Closed shop	250.5	6			
Trade route	252	16	Freedom of seas	288	3
Break-down of transportation	253	5	Rapid increase population	290	2
Unearned income	254	3	Command of sea	290	2
			Darwinism	290	2
Machine civilization	255	2	Short ballot	290	1
Intellectualism	256	13	Power over nature	293	1
Community of power	257	2	Demagogue	293	1
Commercial ties (treaties)	258	2			
Federalism	259	2	World trade	295	1
			"Jingoism"	296	8
			Effective personal freedom	297	4

To determine the important concepts and the relative order of importance of the concepts referred to, by a count of the number of mentions and the number of issues in which they are mentioned, each concept was recorded according to the scheme illustrated in Figure 1. This figure shows the procedure for one concept for four months in the *New Republic* of 1919.

After the completion of the reading and tabulation of all the concepts, the information was transferred to slips of paper (4 by 5 inches) on which were recorded the ranks. In all cases, the formulas selected for the determination of weighted ranks gave due consideration to frequency of distribution, that is, to the number of issues in which the concept was mentioned, as well as frequency of occurrence—the number of times a concept was mentioned. This was done because a count-study in which frequency of mention was the only factor considered was discovered to yield misleading rank orders in many instances. That the reality and reliability of the rank order are increased by a consideration of the frequency of distribution is illustrated and proved in another study.[6] Thirty-two issues of the magazines spread over a period of two years was found to be the smallest sampling of reading which yields the first one hundred concepts. For the purpose of determining the first fifty concepts, a two-year sampling of thirty-two issues of the magazines was found to be superior to a one-year sampling of forty-eight magazines.[7] In Table II are shown the concepts in order of importance as determined by the described procedure.

The study[8] of the completeness and reliability of the list of concepts showed:

1. The selected reading is a fair random sampling for the determination of a list of concepts.

[6] Meltzer, H. *Children's Social Concepts: A Study of Their Nature and Development.* New York Teachers College, Columbia University, 1925. Chap. IX (Teachers College, Columbia University, Contributions to Education, No. 192).

[7] *Ibid.*, p. 81.

[8] Meltzer, H. *Op. cit.* A detailed account of the statistical study of the completeness and reliability of the list of concepts is given in chapter X.

2. The concepts are determined roughly in the correct order.
3. A more real and reliable list of concepts is obtained when, in the determination of the rankings, consideration is given to the distribution as well as the frequency of occurrence, that is, to the number of issues in which the concepts are mentioned as well as the frequency of mentions.

CLASSIFICATION OF FRESHMEN AT BROWN UNIVERSITY

A. H. MacPhail
Brown University

The purpose of this article is to present the findings of a brief inquiry into the relative merits of several tests as means of classifying Freshmen for instruction in English. The results reported here are based upon an analysis of the records of 313 students who took all three of the tests and also received a grade of E, D, C, B, or A in English composition (English I) at the end of the first semester.

In September, 1924, the following tests were given to all Freshmen on a day set aside for that purpose about a week prior to the opening of the academic year: Brown University Psychological Examination, Moore (Dartmouth) Completion Test, and the Classification Test in English. The psychological tests have been given annually since 1918 as a part of the yearly program of the Committee on Educational Advice and Direction.

The English Test was prepared and administered by the Department of English. The questions on this test are quoted here:

PART I

1. Write correctly all the misspelled words in the following list: (20 words).
2. Insert in the following passage the proper marks of punctuation and the necessary capitals, and indicate paragraph divisions with a ¶.
3. Parse and construe the four italicized words in the passage quoted in 2.
4. Without copying, correct all errors in the following sentences: (5 sentences).

PART II

Write a theme of three hundred words or more on the subject "My Purpose in Coming to College."

The time allowance was one and one-half hours. A printed suggestion appeared on the test to the effect that thirty to forty minutes should be allowed for Part I, and fifty minutes to one hour for Part II.

Table I shows the general relationship found to exist between the scores on various tests and the marks in English I as expressed by Pearson coefficients of correlation. These figures show that, in general, total scores on the English test and scores on the Brown test predict grades in English I with substantially the same accuracy. Part II of the English test, the actual writing of prose, possesses only a slightly greater predictive value. No better index of probable success is obtained by adding the Brown score to the total English score. An attempt to secure a better index by converting scores on the English test into equivalent

TABLE I. CORRELATION OF THE SCORES MADE ON VARIOUS PRELIMINARY TESTS AND THE MARKS RECEIVED IN ENGLISH I

	Correlation with English I
(1)	(2)
1. Composite Brown University and English Test—Total	.419
2. Brown University and English Test—Total	.416
3. English Test—Part II	.416
4. Brown Psychological Test	.371
5. English Test—Part I	.371
6. English Test—Total	.368
7. Moore Completion Test	.327

scores on the Brown test and working with the average of the two results thus obtained did not meet with success. An important fact, not revealed by the coefficients alone, is that for both the English test and the Brown test prognosis is considerably greater in the low ranges than in the high. In other words, those who score low on either test seldom do well in English, but those who score high often do work that is apparently below their ability.

Some pertinent facts are revealed by inquiry into the prognostic value of the various tests within certain limited ranges[1]

[1] All quintiles and deciles are based upon the 313 records here analyzed.

as shown in Tables II, III, and IV. For example, Table II shows that of the 61 students who scored in the highest quintile (fifth) on the English test, 5 received A in English I, 23 received B, and only 2 failed. Part I of the English test is shown to be a little less selective than either the Brown test or the complete English test. The total English test is slightly superior to the Brown test in selecting those who get marks better than C in English I. When cases falling in the lowest quintile are considered (Table II) the Brown test and Part I of the English test are shown to

TABLE II. MARKS IN ENGLISH I MADE BY THE STUDENTS SCORING IN THE HIGHEST AND LOWEST QUINTILES ON SEVERAL PRELIMINARY TESTS

	Marks in English I					Total Number of Students
	E	D	C	B	A	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Brown University Test:						
Highest quintile	2	4	32	24	2	64
Lowest quintile	13	17	26	6	.....	62
English Test—Total:						
Highest quintile	2	8	23	23	5	61
Lowest quintile	13	14	33	3	.....	63
English Test—Part I:						
Highest quintile	3	5	30	18	5	61
Lowest quintile	12	18	31	2	.....	63

be equally accurate in selecting those who receive less than C in English I. The total English test is slightly less selective in this lower range.

As might be expected, a considerably greater selectivity is obtained by grouping students who scored in the highest or lowest quintiles on each of two tests. By this means a group can be selected in which there are no failures and 60 percent of the marks are better than C. On the other hand, a group can be selected in which there are no marks higher than C and 30 percent are failures. This is shown in Table III. A comparison of Tables III and IV also shows that the method of grouping

on the basis of the highest or lowest quintile ratings on each of two tests is superior to grouping by highest deciles on either test alone.

The inquiry has also shown that the several subtests in Part I of the English test are by no means of equal prognostic value. The best single subtest is that in spelling. It possesses the best general predictive value in both the high and low ranges. Part

TABLE III. MARKS IN ENGLISH I MADE BY STUDENTS SCORING IN THE HIGHEST AND LOWEST QUINTILES ON EACH OF TWO PRELIMINARY TESTS

	Marks in English I					Total Number of Students
	E	D	C	B	A	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Brown University and English Test—Total:						
Highest quintile	.....	3	9	16	2	30
Lowest quintile	9	7	12	.....	.....	28
Brown University and English Test—Part I:						
Highest quintile	.....	2	8	14	2	26
Lowest quintile	10	8	9	.....	.....	27

TABLE IV. MARKS IN ENGLISH MADE BY THE STUDENTS SCORING IN THE HIGHEST AND LOWEST DECILES ON SEVERAL PRELIMINARY TESTS

	Marks in English I					Total Number of Students
	E	D	C	B	A	
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Brown University Test:						
Highest decile	.....	2	15	13	1	31
Lowest decile	8	12	11	.....	.....	31
English Test—Total:						
Highest decile	1	3	10	13	5	32
Lowest decile	10	6	15	1	.....	32
English Test—Part I:						
Highest decile	2	2	11	10	3	28
Lowest decile	6	8	15	1	.....	30

of this value is due to the fact that the scores on the spelling test were distributed in a more symmetrical manner than were the scores on any other subtest. Subtest 4 (correcting errors in given sentences) stands next to the spelling test in predictive value and is slightly superior to Subtest 2 (punctuation, etc.) in both the high and low ranges. Subtest 3 (parsing, etc.) is plainly the least valuable of the four for prognosis. This last test was evidently far too difficult to serve as a means of differentiation. The manner in which the scores were distributed indicates this for only 2 students scored ten or more points, while 122 scored less than two points.

Last year (1925-26) the English Department revised its classification test in an effort to increase its prognostic value. The new test was given to all Freshmen in September, 1925, and the class was divided into groups for instruction in English on the basis of English-test scores and psychological scores made on the Brown test. This grouping was done in the same manner as was employed with the former year's freshman class. The method and its effectiveness are best described by Professor W. T. Hastings, of the English Department, in the following statement which refers to the academic year 1924-25:

> This year we have instituted the practice again, with a better technique, and the results are proving very satisfactory. We obtained permission to give a grading test to the whole freshman class on the Thursday before the opening of college. The test was carefully prepared, and the papers were read by a selected group of the older instructors. We had available also the scores in the psychological tests—which last year had been shown to have very close correlation with the grades secured in English I by the class of 1927. On the basis of the two scores each Freshman was assigned to an A, B, or C section. In making the assignments we compared in each case the student's two scores. If there was approximate agreement in the evidence they presented, the student was assigned automatically. In case there was disagreement, we re-read the English test to see if the reader's grade was in error. In case his judgment was reaffirmed, we assigned the student to the group indicated by the English test. After four weeks we shifted students who had been mis-classified but found it desirable to change only about 3 percent. At a recent departmental meeting the scheme has been extensively discussed and warmly approved. We are satisfied that for English I, at least, graded sections are the thing.

A SUGGESTION AS TO CORRECTING GUESSING IN EXAMINATIONS

ARNOLD M. CHRISTENSEN
State Teachers College, Winona, Minnesota

This article suggests a way to correct for guessing in new-type examinations so that truer scores may be determined. The usual way of handling an examination is to prepare, for example, a true-false test of a given number of items, give it to the class, score the papers by using a correction formula or by counting the number of items correctly marked, and then to translate the scores into letter grades, points, or percents.

Guessing undoubtedly plays a greater or lesser part in writing any examination, especially the recognition tests, of which the true-false and multiple-response statements are examples. If one could eliminate the guessing element or correct for it adequately when scoring examinations, it is evident that more accurate and hence more useful scores could be obtained. While it may be extremely difficult to correct entirely for guessing or to write examinations which eliminate the chance element altogether, the plan advanced in this article has merit, for it seems not only to produce more reliable and valid scores but also to indicate rather definitely just where the examinee has guessed.

The scheme is simple. First prepare, for example, a true-false test. Next prepare a multiple-response test on the same material as was used in the true-false test, making the multiple-response statements correspond item for item with the first test. In other words, recast each true-false statement into multiple-response form. Now give both tests to the class. If desirable, separate the two tests by an interval of a day or so. In scoring the tests, give each student one point for each pair of corresponding items correctly marked. This means that to earn a point on the first element the examinee must have both Item 1 in the true-false test and Item 1 in the multiple-response examination correctly marked. Incorrect marking of either or both of the corresponding items is regarded as showing an insufficient

knowledge of the subject and an evidence of guessing. Omissions may be treated the same as wrong replies in scoring because omissions likewise indicate lack of knowledge.

This plan has been tried with interesting results. A student teacher, J. R. Oltobell, prepared the examinations and also carried out the experiment. In order to insure the highest possible accuracy, the scoring was done three times. All of the statistical work was done by the writer and checked by two other people.

TABLE I. SCORES ON A TRUE-FALSE TEST OF ONE HUNDRED ITEMS AND ON A CORRESPONDING MULTIPLE-RESPONSE TEST

Pupil	True-False Test		Multiple-Response Test (Rights)	Score on Combination
	Rights minus Wrongs	Rights		
C. T.	72	86	85	77
C. G.	70	85	84	74
M. S.	82	91	79	73
R. G.	80	90	68	66
H. B.	66	78	66	63
O. H.	63	77	70	61
R. B.	71	85	65	59
H. T.	56	79	69	59
L. T.	54	77	68	55
E. C.	50	77	60	52
G. M.	46	73	63	51
B. S.	50	73	59	48
M. P.	48	74	57	48
J. B.	54	74	57	43
C. D.	31	65	55	37
Medians.	56	77	66	59

Mr. Oltobell taught a ninth-grade civic-science class. More than two weeks were spent on the subject of transfer of diseases. While the unit was being taught, a 100 item true-false test and a corresponding 100 item multiple-response examination were prepared. When the class had finished studying transfer of diseases it was first given the true-false examination and the following day the multiple-response examination. The results are shown in Table I.

When the true-false scores are corrected for guessing the result is necessarily lower than the corresponding uncorrected scores. It will be noted, too, that the scores (Column 2) derived by the "rights minus wrongs" method run lower than the scores on the multiple-choice test. The scores when combined by the method here suggested, although they yield a median not much different from that of the "rights minus wrongs" scores, are different for individual pupils, sometimes materially different.

Considering the last three columns only it is evident that pupil C. T. guessed at some of the true-false statements and also at some of the multiple-response items because the combination score for this pupil is lower than either of the other two test scores. The same is true for all of the pupils. By examining the individual papers, one could tell quite definitely what statements were guessed at by each pupil. It is, of course, true that a pupil may guess right both times on a given pair of corresponding items, but it appears that the combination scores could not have been materially raised by such excellent luck. If the combination test does correct at all satisfactorily for guessing, the reliability and also the validity of such a test ought to increase. That this is the case is shown in Table II. In computing the coefficients of reliability the method used by Ruch was followed.[1]

Since one way to measure the validity of a test is to correlate it against an outside criterion, the tests of this experiment were correlated against the Van Wagenen General Science Reading Scale A, which had been given shortly after the examinations on transfer of diseases. The Pearson product-moment method of calculating the coefficients was used.

Table II clearly shows, at least as far as the facts of this experiment are concerned, that the "rights minus wrongs" method of scoring the true-false test did not give as reliable or as worthwhile results as was obtained by counting the number of rights only; that the multiple-response examination was superior to

[1] Ruch, G. M. *The Improvement of the Written Examination.* Chicago, Scott, Foresman and Company, 1924. pp. 132-37.

the true-false test whichever way it was scored; and that the combination test described in this article was not only more reliable but also more valid than either of the other two tests.

Now, it is appreciated that by lengthening the examinations higher reliability can be effected. By using the formula,[2]

$$n = \frac{r_{nn}(1 - r_{12})}{r_{12}(1 - r_{nn})}$$

one can prophesy how long the true-false and multiple-response tests have to be to give reliability coefficients equal to that of the

TABLE II. RELIABILITY AND VALIDITY

	True-False Test		Multiple-Response	Combination Test
	Rights minus Wrongs	Rights		
r's of reliability of chance halves	.50	.61	.67	.81
r's of reliability of whole test	.67	.76	.80	.90
r's with Van Wagenen General Science Reading Scale A	.29	.34	.48	.54

combination tests, which are shown in Table II to be as high as .90. By using the r's of reliability of the chance halves of each test as r_{12} the predictions shown by the formula are given in Table III.

It is also appreciated that increasing the reliability of a test also tends to increase its validity and that a test covering two hundred different items is a better test than one covering only half that number because the former affords a more adequate sampling of the subject-matter. It is, however, doubted whether it is easier to write 450 or even 288 true-false questions or to write 222 multiple-response statements than to write a true-false test of 100 items and a corresponding multiple-response test of

[2] In this formula r_{nn} is the reliability coefficient which would be obtained if the examination, of the reliability designated by r_{12}, were n times as long.

the same length—doubted even though it may be a rather difficult task to recast statements into another form.

In this connection it is interesting to estimate how long it would take to give each of the tests shown in Table III. Using Ruch's lowest estimate[3] of items suggested per minute for high-school students (10 true-false and 6 multiple-response items) we see that the T—F : R—W test of 450 items may be given in 45 minutes, that the T—F : R test of 288 statements may be given in 29 minutes, and that the M—R : R test of 222 items may be given in 37 minutes. The combination test, however, may be given in less time than any of these, for the 100-item true-false

TABLE III. THE LENGTH EACH TEST WOULD HAVE TO BE TO GIVE A RELIABILITY COEFFICIENT EQUAL TO THAT OF THE COMBINATION TEST

Test	Length to give an r of .90
True-False	
Rights minus wrongs	450 items
Rights	288 items
Multiple-Response	222 items

part would take 10 minutes and the multiple-response part 17 minutes, a total of 27 minutes. On the basis of equal reliability the combination test, then, has a slight advantage with respect to amount of time it may consume in the classroom.

Thus we see that high reliability and possibly also high validity may be secured by increasing the length of an examination; but although a test is lengthened, it does not therefore definitely or at all correct for guessing, which is the chief issue in this article. In conclusion, then, it may be suggested that giving a combination of tests, such as has been here described; makes it possible to correct more definitely for guessing and also to increase the reliability and validity of an examination.

[3] *Op. cit.*, page 97.

A STUDY OF THE CAUSES OF INFERIOR SCHOLARSHIP OF PUPILS IN LOW FIRST GRADE

IRENE HALL
AND
AMY CROSBY
Kenosha, Wisconsin

Our first-grade teachers repeatedly complained, during the school year 1924-25, that their groups of children were inferior in mental ability to the groups which they used to have in the same school. They claimed that it was more difficult to cover the minimum essentials of the course of study than it used to be to cover the maximum amount of work. They insisted that methods and devices which had been effective before brought little result with these groups; that their ingenuity was taxed to the utmost to find ways of interesting the children; that the pupils' comprehension of simple stories, games, and pictures was very low; that their attention was spasmodic, their memories erratic, and their general progress discouragingly slow.

We decided to study the school records of the first-grade children in the Bain School to ascertain whether statistics supported these contentions and to try to find the reasons for them. If these first-grade children were inferior to past groups, was it because of physical defects, bad environment, non-attendance at school, or low-grade mentality? Why should any of these causes, either singly or in combination, operate more unfavorably during one year than another? Since most of the children in the first grade during the school year 1924-25 were born during the years 1917 and 1918, was the condition, complained of by the teachers, one of the by-products of the war? These were the questions we attempted to answer in our investigation.

We first obtained the records of scholarship in the low-first grade for each child born in the years 1914 to 1919 inclusive, and determined the average for pupils of each birth year. To procure a definite average it was necessary to use figures for the descriptive ratings which were given children in the first grade.

Five general terms were used: poor or failure, 65; fair, 75; good, 85; very good, 95; and excellent, 100. The total number of I-B children whose records were known for the six birth years was 425. Of this number, 106 were failures, 133 were marked "fair," 127 were marked "good," 49 "very good," and 10, "excellent." Of the total number of children, 2 percent were rated excellent, while 25 percent were failures. The greatest number of failures came in the groups born in 1917 and 1918. The pupils are classified in Table I by their birth years. The

TABLE I. SCHOLARSHIP RATING OF PUPILS WITHIN THE YEAR-GROUPS

Year of Birth	Number of Children	Number per Scholarship Rating					Average Scholarship Rating
		Failures	Fair	Good	Very Good	Excellent	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1914.....	71	15	13	25	12	6	82
1915.....	76	18	29	22	5	2	76
1916.....	72	13	19	24	16	.....	81
1917.....	90	24	26	26	14	.....	78
1918.....	87	28	35	21	1	2	74
1919.....	29	8	11	9	1	.....	76
Total...	425	106	133	127	49	10	

Failures.....25 percent
Excellent..... 2 percent

average scholarship rating for each year-group shows a decrease as the years go on. The year-group for 1918 had the lowest average, 74 percent; and the year-group 1914 had the highest average, 82 percent.

The average scholarship for groups of children born in 1911, 1912, and 1913 was then found. These averages were much higher than the averages shown in Table I, being 90, 86, and 95 respectively. Table II gives the figures in detail. The failures among the children born in 1911, 1912, and 1913 amounted to 9 percent as compared with 25 percent (Table I) for the children born during the period 1914-19. This shows an average

increase of 16 percent. The number of children who were rated excellent in scholarship decreased. The average for the earlier year-groups was 16 percent compared with 2 percent for the later groups, a decrease of 14 percent. These statistics would seem to prove that the general trend of the scholarship has been downward and that the opinions of teachers were correct when they declared that the groups of children which they taught in 1924-25 were inferior to those of former years. To find out why this was true was our next problem.

The questions which confronted us here were, May the decrease in average scholarship be due to the fact that teachers are

TABLE II. AVERAGE SCHOLARSHIP RATING OF EARLIER GROUPS OF CHILDREN

Year of Birth	Number of Children	Number per Scholarship Rating					Average Scholarship Rating
		Failures	Fair	Good	Very Good	Excellent	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1911.....	8	2	3	2	1	.....	90
1912.....	26	3	9	8	5	2	86
1913.....	43	2	5	20	6	10	95
Total...	77	7	17	30	12	12	

Failures..... 9 percent
Excellent.....16 percent

constantly changing or to the fact that teachers' judgments vary? Are those who are now first-grade teachers more exacting in their standards than were those of perhaps five, eight, or ten years ago? In our survey these questions can be answered negatively, since most of the first-grade teachers have been in the school for a number of years and have taught the groups which are being compared. No reliable tests for the educational accomplishments of the primary grades have been devised, but a teacher who has been in the same grade for a period of years and who has met group after group of pupils, many of them from the same families and all of the same type, should be a fair judge of the abilities of these pupils.

The possible causes for the increasing number of failures—irregular attendance, ill health, poor home conditions, inferior mentality, retarded development, and unknown causes—were tabulated, and the results are shown in Table III. The total number of failures for the year-groups of 1914 to 1919, inclusive, was 139. Fifty-one of these failures were due to ill health and 58 to inferior mentality; these were the two most important causes. The number of failures due to ill health was greatest among the children born in 1914 and 1915, while those due to inferior mentality were most frequent among the children born in 1917 and 1918.

TABLE III. NUMBER OF FAILURES DUE TO DIFFERENT CAUSES

Year of Birth	Number of Failures	Irregular Attendance	Ill Health	Poor Home Conditions	Inferior Mentality	Retarded Development	Unknown Causes
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1914.....	19	.....	11	3	2	1	2
1915.....	27	1	14	.....	10	.....	2
1916.....	22	1	9	3	9	.....	.....
1917.....	33	1	8	7	16	.....	1
1918.....	29	1	6	2	17	1	2
1919.....	9	1	3	.....	4	1	.....
Total...	139	5	51	15	58	3	7

Irregular attendance is supposed to be one of the common causes of failure, yet we find that only one of the children we are studying failed for this reason alone. Non-attendance is given as a contributory cause in but two other cases, while in only five cases was the attendance less than 75 percent of the total number of school days. So it would seem that as an explanation for the present first-grade failures, non-attendance may be dismissed as negligible.

Very few of the children of Bain School have American-born parents. The teachers often contend that this is a handicap which causes lower averages in scholarship. From the survey of the records of our pupils taken in June, 1924, Mr. Phelan found little difference due to nationality. In spite of the for-

eign languages and the foreign customs which make an entirely different home environment from that of native American children, he found that many of our pupils of foreign parentage have scholarship records as good as the average and in some cases better. The proportion of first-grade failures according to nationalities was next determined. Seventy-five percent of the pupils in our group of 106 were Italian-American, 8 percent were Polish-American, and 17 percent included American, German-American, Slavish-American, and other nationalities.

TABLE IV. NUMBER OF PUPILS HAVING DIFFERENT TYPES OF PHYSICAL DEFECTS

Year of Birth	Number of Failures	Defective Teeth	Tonsils	Glands	Adenoids or Nasal Breathers	Eyes	Tuberculosis	Speech Defects	Other Serious Defects	Totals
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
1914..	15	11	9	8	2	4	2	.....	2	38
1915..	18	10	13	8	8	2	1	.....	3	45
1916..	13	8	10	7	3	.....	.....	.....	4	32
1917..	24	12	13	7	1	1	.....	1	8	43
1918..	28	12	13	7	6	4	.....	4	3	49
1919..	8	2	2	3	1	.....	2	.....	3	13
Total.	106	55	60	40	21	11	5	5	23	220

Three teachers in our school examined the records of our children above the first grades and found that of 51 children who failed of promotion, all but two had marked physical defects. We find that of the first-grade failures only 26 appear due to this cause alone. While many physical defects exist, the proportion of children thus handicapped is much smaller than in previous years. This is largely due to the influence of the school nurse—an influence which is becoming a more potent factor in the community from year to year. The health teaching in the school of previous years is also making its effect noticeable, for the ideas so learned are being put into practice at home by the older children. In general, the physical condition of our present first-grade children is better than in former years. Fewer of

the failures are due to this cause than ever before in the records of the Bain School.

Table IV shows the classification of our 106 failing pupils according to types of defects. Fifty-five of these pupils had defective teeth, 60 had enlarged or diseased tonsils, 40 had defective glands, 21 had adenoids or were nasal breathers, 5 were tuberculosis suspects, 11 had defective eye-sight, 5 had speech defects, and 23 had other serious physical defects including nervousness, anemia, and goiter. Those having no physical defects numbered 24. Twenty-two percent of the failures within the

TABLE V. THE NUMBER OF FAILING PUPILS HAVING ONE OR MORE PHYSICAL DEFECTS

Year of Birth	Number of Failures	Number of Physical Defects				Serious Defects	Minor Defects
		None	One	Two	Three or More		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1914.....	15	2	1	4	8	6	9
1915.....	18	4	2	1	11	1	17
1916.....	13	2	2	2	7	2	11
1917.....	24	8	3	4	9	6	18
1918.....	28	5	2	6	15	3	25
1919.....	8	3	.....	.....	5	4	4
Total.....	106	24	10	17	55	22	84

year-groups 1918 and 1919 had no physical defects, 20 percent had serious defects and 80 percent had minor defects. Table V shows the number of pupils having one, two, and three or more defects. Forty-two percent had three or more physical defects.

We are inclined to believe that poor home conditions alone explain almost any lack we may find in the children. Surely very few of the homes of our children furnish ideal conditions in which a child may develop properly. Over-crowded, unventilated rooms, sketchy meals, irregular bedtime, all varieties of dirt—moral no less than physical—none of these is conducive to the best interests of children, and all are reflected in their attitudes and reactions to school problems. In some homes children

are a commercial asset to be exploited, in others a nuisance to be endured, and in some happier homes they are playthings to be teased and bullied into furnishing entertainment for their elders. Over-indulgence goes hand in hand with gross neglect, and parents who themselves have never learned self-control can scarcely be expected to teach that or other desirable traits to their children. A majority of our children come to us totally without discipline and without the little habits of personal care which one naturally expects a six-year-old child to have acquired. Teaching the use of the handkerchief takes time that other schools can apply to more pleasant, if not more necessary, activities.

We cannot claim, however, that there is no improvement in these respects from year to year. Compared to their predecessors, these groups of children do show evidences of some improvement in their home conditions. Social workers, baby clinics, school nurses, and the school training in health gained by the older children of the families have all helped to raise the level of the homes. Thirty-two of our first-grade failures of 1918 and 1919 come from families having older brothers and sisters in school. The home conditions are in many cases much better for these younger children, yet more of them are falling behind in their school work than ever before.

Our investigations show us that of our present first-grade failures, 24 percent are due to physical defects; 1 percent, to non-attendance; 1 percent, to home conditions; 8 percent, to retarded development; 24 percent, to a combination of ill health, poor home conditions, and non-attendance. There is still about 42 percent of the failures to be accounted for. The teachers of these children firmly believe that while in some few cases the children are slowly developing and in time will do quite creditable school work, practically the entire 42 percent of our failures is due to a low grade of mentality.

Twenty percent of these children were so definitely subnormal that they were placed in a separate group and were given more games and rhythmic exercises and more handwork than the

other children. This group was so far below normal that first-grade work was not even attempted with them. Twelve others in our list have passed through this preparatory stage of one semester and are now attempting to do the minimum amount of I-B work required. The portion they are able to memorize makes up in part for their lack of comprehension and may secure them a promotion card, but it is no guarantee of ability to take more than a few halting steps on the ladder of learning. Six of these children are listed for the opportunity school and are merely being kept in the slow group, until vacancies occur. Thirty-two of these failures have older brothers and sisters whose school records are much better than theirs, indicating a

TABLE VI. FAILURES OF THE SIBLINGS OF THE FIRST-GRADE PUPILS BORN IN 1918 AND 1919

	Year-Group	
	1918	1919
Number of families represented	24	8
Total number of pupils in these families	77	23
Total number of failures	39	9
Number of first-grade failures in year-groups	24	8
Pupils in opportunity room	4	0

downward curve in the mentality of the family progeny. Although we are only considering failures in our statistics we are not blind to the fact that the story is but partly told. Many of our children have been promoted with a mark of "fair" or even "fair minus," who really in the teachers' judgment should have repeated the work.

A survey of the older brothers and sisters in the families having pupils in the 1918 and 1919 year-groups was made, and the results are shown in Table VI. Of 24 families represented in the 1918 year-group there were 39 failures among the 77 children. Twenty-four of the 39 failures were those of the first-grade pupils born in 1918. There were then only 15 failures to be distributed among other years. The pupils of the year-group

1919 who had older siblings in the school belonged to eight families. Among the 23 children of these families there were 9 failures, and 8 of these failing pupils were born in 1919. There were 4 opportunity-school pupils in the 1918 year-group and none in 1919. This would seem to prove that the older brothers and sisters in the same families of our failures for the 1918 and 1919 year-groups were mentally superior.

Questionnaires were sent to the parents of all our children born during 1917, 1918, and 1919, but of the total number only four fathers served in the army during the World War. At first glance that seems to repudiate our contention that war conditions might have been responsible for the mental inferiority of this group. But were not others affected by the general hysteria of the time, though not active participants? These children are practically all from Italian, Polish, or Lithuanian homes. The parents were deeply concerned in war issues, for their closest friends and relatives were in the armies of our allies. Naturally a very emotional people, the Italians particularly were living under a great nervous strain. Added to the general high tension and temporary mental unbalance it occasioned, were the more direct effects of lack of pre-natal care and care during early infancy which means so much to a child's later development.

Though various causes operated together, it is a plausible supposition that war has set its stamp upon the minds of these children, placing many of them in the ranks of the socially handicapped. Yet we cannot be sure. They should be observed for a period of years and compared with both younger and older children. Similar studies should be carried on with children in different localities. The question of the effect of the war stress and the war hysteria upon the scholarship of school children must at present remain open.

Editorials

ARE WE TOO HIGHBROW?

Sometime ago a layman interested in the progress of education said to a university president, "What are the best educational magazines you read?" The reply was, "I don't read any of them. It is not because I haven't time, but because they have such technical vocabularies I can't read them without constant reference to a dictionary and I haven't time for that."

This bit of conversation raises several important questions with reference to educational magazines in general and our own in particular. Are the articles too technical for university presidents to read? Are they too technical for the members of the Educational Research Association of which the Journal is the official organ? Are they too technical for college teachers of education whom we expect to be interested in the field of educational research? Are they too technical for school administrators, supervisors, and teachers upon whom lies the responsibility for putting into practice the findings of research? Where should material be published which reports new technical procedure, new formulas, new applications of the old?

The question is raised frankly because a question of policy is involved. For whom should educational magazines be published? What is their mission? Is their primary object simply to report or is it to report in order to modify practice? Are they publicity agencies for their contributors or are they service instruments for the benefit of the school children of the country? How much technical education have we a right to assume on the part of readers or to what extent may these magazines be expected to be the source of this technical education?

As we examine educational magazines we find evidence of various policies. Some are so free from technical terms that it

is safe to assume that anyone can read them—even university presidents, and that without a dictionary. Most of these relate personal experiences and opinions and savor little of contact with research and the scientific movement in education. They are apparently written for teachers who are neither trained nor critical. Others show evidence of an awareness of present educational tendencies. Their articles report the results of a variation of procedure which was to some extent at least checked by control methods. The language is relatively simple though the statements at times are dogmatic. Some discrimination is evidently expected of the reader though all the data are practically never presented. A third type of magazine is also available. This type fairly bristles with technical terms—quartiles, percentiles and ogives, P.E.'s and sigmas, correlations multiple and partial, and regressions. Statistics by which to validate procedure and test the results have become an important instrument in scientific educational work, and therefore the authors, having made use of statistical procedure, feel the necessity of reporting all of it in the reports of their experiments.

Whenever any one develops a new formula or a new use for an old formula, technical workers will certainly be pleased to know about it. Every worker should safeguard himself by every means at his disposal in the conduct of an educational experiment and the interpretation of his findings. On the other hand, when reporting investigations which are of value to public-school people, it is certainly a mistake to burden the report with a technical vocabulary which few understand. Research findings are valuable only as they modify educational practice.

E. J. A.

BEING OR BECOMING

We no longer think of education as something to be got during the fleeting years of childhood and youth; in the elementary school, high school, and college. It is more than mere information or knowledge, and it is not simply acquired. From

these statements it may be inferred that education is something brought in from without; something which may be received complete during the period of formal instruction.

Instead, education is change, adjustment. It should be, and in large measure is, a continuous process from birth to death, beginning before school days and continuing long after. Conduct which is different today from yesterday's is evidence that we are still being educated. If our standards, our opinions, and our reactions are the same today as last year, education for us has ceased and intellectual life becomes inactive.

As judged by this criterion, what is the condition in your schoolroom, your building, your school system? What is the evidence of continued growth, change, and adjustment to the changing world in which we live? Have you an improved method, a richer content, or a more vital procedure in any of your class work? If so, it is a sign of continued education. Have you, as principal, thought of new problems for attack, of new means of stimulating your teachers, of a new form of organization which results in better individual work combined with more excellent cooperation? Then the educational process has not ceased with you. Have you, amidst the multitude of your duties as superintendent, found a more effective way to interpret your schools to the public, to furnish your board with expert guidance in the formulation of policies, to unify the efforts of principals, supervisors and teachers to the end that the great objective of the schools may be attained in the children? It is gratifying indeed.

The year is well under way. Routine should have been cared for long ago. The machinery should be moving smoothly. Let us take stock of ourselves to see if education is a past or present thing with us. A project, undertaken because we cannot be content to remain as we are, is the most certain antidote to growing stale, to becoming self-satisfied, to getting into a rut. It is a type of stimulation which results in continued education for all concerned.

E. J. A.

Reviews and Abstracts

HECK, A. O. *A Study of Child-Accounting Records.* Columbus, Ohio, Ohio State University, 1926. 245 pp. (The Ohio State University Studies, Vol. II, No. 9, Bureau of Educational Research Monographs, No. 2)

Dr. Heck has courageously attempted a solution in a field in which many have dabbled but to which altogether too few have contributed. For some unknown reason, the problem of "school records" has been long overlooked by the student of research. Yet, to the reviewer, an adequate program of recording and reporting is fundamental to the successful completion of the majority of investigations and researches being made in public education. The failure of the educational profession to develop a uniformity in "recording and reporting" carries with it a loss difficult to estimate. Huge wastes of time and money result, indefensible conclusions are reached through unsound data, and the questionnaire is resorted to as the last defense.

Dr. Heck delves into the child-accounting phase of recording with a vigor which is refreshing. He indicates the difficulties arising out of the failure to standardize terminology, and illustrates how the masses of figures collected in city, state, and federal reports might have untold value to education if the original data had been similarly defined by all contributors and adequately safeguarded on their passage to their final destination. The author cannot refrain from showing us, as has been done so many times before, that such commonly used terms as average daily attendance, aggregate attendance, and membership vary to such degree in their definitions in the different states that comparisons seem hopelessly invalid. To illustrate, here are given sixteen terms which, according to the author, are evidently intended to express the same idea:

1. Aggregate
2. Total attendance
3. Total days attendance
4. Total days attended during term
5. Total number days present
6. Actual days attendance
7. Number of "presents"
8. Sum of days present
9. Number days present
10. Adding total days present
11. Sum of days present
12. Number days present for term
13. Aggregate days of attendance
14. Whole number of days attended
15. Actual number of days all the pupils attended
16. Whole number of days attendance of all pupils

To illustrate further the lack of uniformity in recording among school administrators, the author reports that 1,515 separate items concerning the child were found on record cards in use in school systems. Of these, 760 items occurred only once while 237 had a frequency of two each. Should such initiative and originality be encouraged in the child-accounting field? Why cannot administrators agree upon a core set of items to be used, leaving the unusual items to be uncovered by the investigator who needs them?

Dr. Heck has shown clearly that the school superintendent should develop his "program for recording and reporting" as he would a salary schedule, a school-building program, or a continuing curriculum study. Unplanned and haphazard development of a record system must give way to a "recording" program in which administrative vision, known utilization, standardization, and correlation with state and national recording programs will be deciding factors. The superintendent of schools who reads Dr. Heck's study—and all will profit from reading it—will hesitate long before he allows the fancy of the moment to play its usual part in the development of such important administrative machinery as the child-accounting system should be.

N. L. ENGELHARDT

Teachers College, Columbia University

BROOKS, FOWLER D. *The Applied Psychology of Reading.* New York, D. Appleton and Company, 1926. 278 pp.

O'BRIEN, JOHN A. *Reading: Its Psychology and Pedagogy.* New York, Century Company, 1926. 308 pp.

KLAPPER, PAUL. *Teaching Children to Read* (4th ed.). New York, D. Appleton and Company, 1926. 304 pp.

The continuation of an unprecedented interest in reading instruction is shown by the publication, within the last four years, of twelve special method texts on the teaching of reading in the elementary grades. Three of these are copyrighted in 1926. Important contributions on reading have been appearing so rapidly that a text on the teaching of reading is likely to be somewhat out of date by the time it is published. For instance, not one of these three new books mentions the *Report of the National Committee on Reading*, a 300-page volume published in February, 1925.

An abundance of references on both the underlying science of reading instruction and on methods is given in the Brooks' volume. His treatment of the psychological principles and also their application indicates that he made a careful study of the literature available in the field at the time the book was written. One feels, however, that the author has failed to outline a program of general and specific objectives in reading. The book would be more helpful to teachers if it were richer in illustrative lessons and activities closely related to fundamental principles. On the other hand, the complete table of contents and index make it a valuable reference book for students and teachers.

Many of the authors of the newer texts on the teaching of reading have quoted to a greater or less extent from scientific monographs and magazine articles. No author has drawn so copiously from previously published material as has Father O'Brien in his book, *Reading: Its Psychology and Pedagogy.* The book is based in the main upon the author's own extensive experiment in training in rapid silent reading. Evidently it was written before the publication of the *Report of the National Committee on Reading*, and W. S. Gray's monograph, *Summary of Investigation in Reading.* One who is familiar with these two significant volumes and with recent developments in varied methods

of teaching reading is impressed with the marked incompleteness of this new book, both from the standpoint of the contributions of research and of method principles and technique.

While certain distinguishing characteristics of Mr. Klapper's earlier book have been retained, the text has been reorganized in considerable measure and has been extended with the idea of meeting the needs of teachers through the ninth year. The new viewpoint and methods in relation to silent reading have been included. The author has an unusual style and his latest edition is a decided improvement upon the original volume. One weakness of the book is its lack of a broad program of general and detailed objectives and reading activities as outlined in the *Report of the National Committee on Reading*. While there are many helpful suggestions throughout the book, it needs more specific illustrations of reading lessons and activities.

CLARENCE R. STONE

Leland Stanford University

COUNTS, GEORGE S. *The Senior High School Curriculum.* Chicago, University of Chicago, 1926. 160 pp. (Supplementary Educational Monographs, No. 29)

Both the curricula and the specific subjects of study offered in the schools of fifteen cities, carefully selected to take in all geographical sections of the country, have been investigated in detail by Dr. Counts. The result is this accurate and representative study of the existing status of the senior high-school curriculum.

General characteristics of the existing curricula reveal a chaotic situation in organization due to the fact that schools are in a state of transition. The general trend is unmistakably toward "a system of schools consisting of a six-year elementary school, a three-year junior high school, and a three-year senior high school." A detailed analysis is given of the principal high-school subjects offered. Not merely the topics studied under these various subjects, but the proportion of time which teachers are devoting to the separate divisions of each subject, is presented. The reader is able, therefore, to determine to what extent the acknowledged objectives of secondary education are consciously functioning in the teaching of high-school subjects.

Dr. Counts has gathered and organized a large number of extremely significant facts, but lack of space allows reference only to the constants in the program. He finds the constants of the curriculum in a state of flux: foreign language has disappeared as a constant but ranks fourth in its hold upon total proportion of pupils' time; mathematics is still a constant, standing fourth in the list, with natural science fifth; English is first; physical education, second; and social science, third. "In the future the prescribed subjects will be composed largely of English, physical education, social science, natural science, and the fine and the practical arts."

We have in this investigation a valuable contribution to the study of the secondary-school curriculum—valuable because it is characteristic of all of Dr. Counts's work, and because it presents objectively and accurately a

mass of facts and a searching appraisal of existing conditions based upon these facts. Together with James M. Glass's companion study in the junior high-school curriculum it supplies a basis for evolving a curricular program somewhat in harmony with the needs and aspirations of American life.

V. T. THAYER

Ohio State University

CORNING, HOBART M. *After Testing—What?* Chicago, Scott, Foresman Company, 1926. 208 pp.

The use of test results in modifying school administration and classroom procedure is the subject discussed in this book. The material presented is the result of experiences in the school system of Trinidad, Colorado, where a definite testing program has been carried on for several years and where, for four years, the schools have been reorganized with intelligence as the basis of all classifications.

The author holds that the real value of a testing program lies in the use that is made of test results. He tells in detail how his testing program was carried out and why, and the uses he and his teachers made of the test results.

The book is clearly and interestingly written and contains many helpful suggestions to superintendents and teachers for the application of test results to classroom procedure and school organization. It is a decidedly worthwhile contribution to the more practical side of the testing movement.

S. S. BROOKS

Muskegon Junior College

INSKEEP, ANNIE DOLMAN. *Teaching Dull and Retarded Children.* New York, Macmillan Company, 1926. 455 pp.

In recent years the problems of public education have been greatly increased and seriously complicated by the extension of the ages of compulsory education and the enforcement of more rigid standards of school attendance. Today, not only the teachers of special-case classes, but the teachers of regular classes as well, must know the dull child and the type of educational experiences from which he can derive a fair measure of advantage.

Teaching Dull and Retarded Children is a book which will prove of value to those having to deal with backward pupils. Dr. Inskeep's detailed knowledge of psychology, sociology, curriculum materials in a wide variety of subjects, educational theories, and teaching techniques is evident throughout the volume. The details of no one of these subjects are brought out fully, of course, but a wealth of suggestive materials, hints, and devices is presented in a form that teachers should find extremely useful. The author says that the teaching procedures which she discusses "are not theories about what should be taught, but classroom experiences as to what can be taught."

The goal to be attained and the teaching procedures necessary in the instruction of retarded children are first discussed in a general way. The

book then offers some specific suggestions for teaching reading, language, spelling, arithmetic, handwriting, the social studies, health, thrift, the appreciation studies, manual training, and games. Much of the material presented is worth while for teachers of average and above-average children, but the book, as its title indicates, is specifically adapted to the problems of teaching below-average children. The book does not create the impression that ordinary teaching methods are simply softened or toned down to the needs of dull pupils. The materials and suggestions offered are unique, and, so far as the reviewer is able to judge, well adapted to classes of subnormal children.

Teachers of special classes will read this book, of course, but every elementary teacher who would understand dull children and know better how to educate them should read it. Principals and superintendents should also read it. Indeed, any one interested in public education will find the book interesting and profitable.

R. L. MORTON

Ohio University

RUSSELL, CHARLES. *Classroom Tests.* Boston, Ginn and Company, 1926. 346 pp.

The title of this book, *Classroom Tests,* designates it as a practical treatment of a field of almost universal interest to the classroom teacher. The subtitle makes it clear, however, that the book is more than that. It is "a handbook on the construction and uses of non-standard tests for the classroom teacher"—another of a series of recent contributions dealing with the development and the improvement of informal or non-standardized measuring instruments. Through the presentation of many illustrations of types of informal test exercises which may be prepared by any classroom teacher, it is probable that this purpose is quite adequately realized by the author. As a source of new material for the research student, however, the book is not as valuable as are other more technical treatments of the field.

In his efforts to establish the case for informal objective tests, the writer takes occasion to show how these types of tests are necessary because of certain limitations incident to the use of standard tests. It seems that a stronger case for informal objective tests would result from carefully establishing the values of *all* objective measuring devices, and proceeding from that point to show the special function of these devices in the total field of measurement.

The discussion of classroom tests as diagnostic instruments assumes what seems to be an inadequate and somewhat unfortunate conception of diagnosis in measurement. Nearly all measuring instruments in education are diagnostic within certain limits. Tests, to be valuable for diagnostic purposes, must be of established validity, reliability, objectivity, discriminative power, and general administrability. These criteria can hardly be met by informal tests in spite of the care with which they may be made. Their brevity, their organization, and the inability of their authors adequately to analyze their content combine to limit their diagnostic values.

A new method of securing "reliable composite scores" is described. This measure, which is called the M-score, is similar in many ways to the T-score as popularized by McCall, except that "the scores here obtained are comparable only with the scores obtained in teacher classroom tests with the same group of pupils." The reasons for the special superiority of this technique over that of the ordinary percentile scores are not made apparent.

The volume on the whole must be classed as a helpful book for the group for which it is designed. Its value would be considerably increased, however, if the author had utilized somewhat more extensively the experimental evidence on informal objective tests, dealing particularly with the matters of guessing and corrections for chance in the use of true-false and multiple-choice tests which must have been available at the time the manuscript was being prepared.

H. A. GREENE

University of Iowa

MORRISON, HENRY CLINTON. *The Practice of Teaching in the Secondary School.* Chicago, University of Chicago Press, 1926. 661 pp.

This book, with the exception of the chapters dealing with the practical arts, is essentially the same as the mimeographed edition of *The Teaching Technique of the Secondary School* published in the course of the past two years by Edwards Brothers of Ann Arbor, Michigan. The work should appeal to teachers and supervisors as a significant study in secondary-school teaching procedure—significant because it gives concrete expression to a distinctive conception of the function of secondary-school methods.

Secondary education, as Professor Morrison views it, relates to that period "in which the pupil is capable of study but is incapable of systematic intellectual growth except under the constant tutorial presence of the teacher." If the ability to proceed independently in the development of certain intellectual interests is the appropriate outcome of secondary-school teaching, emphasis shifts from exclusive pre-occupation with lesson learning to certain changes in boys and girls which subject-matter and its mastery are designed to effect. Not information, but the transformation of the pupil, becomes the true product of learning. This transformation consists of new understandings, new attitudes, new powers, and new skills. The test of acquisition is relative permanency and habitual use in the ordinary activities of life.

This is a meager statement of the point of view dominating the study. Morrison himself lays it down in detail and applies it concretely to teaching. His procedure contrasts with the usual recitation system; his technique aims at pupil changes; and his basic conception is the mastery notion, which he contrasts with lesson learning.

The chapters devoted to "Control Technique" describe a procedure which is designed to measure group-control by counting noses, and individual application by various "close-ups" on pupil behavior "even to the point of being able to follow roughly the eye-movements." Fortunately the teacher

who devotes himself conscientiously to the development of the teaching unit can find other ways of securing effective outcomes. The reviewer suspects this part of the book will survive only as a curiosity in a museum devoted to educational eccentricities, while the main discussion will long continue to promote the development of vital and effective teaching.

V. T. THAYER

Ohio State University

WASHBURNE, CARLETON, AND VOGEL, MABEL. *Winnetka Graded Book List.* Chicago, American Library Association, 1926. 286 pp.

TERMAN, LEWIS M., AND LIMA, MARGARET. *Children's Reading.* New York, D. Appleton and Company, 1926. 364 pp.

Two books attempting the compilation of children's book lists have recently been published. While the purpose of the two books is much the same, the method of procedure is different, that used by Washburne and Vogel having been almost exclusively statistical and that by Terman and Lima largely subjective.

Washburne and Vogel, through the cooperation of eight hundred teachers in thirty-four cities in various parts of the United States, ascertained what books are read and liked by 36,750 children. The list of books is graded according to reading ability rather than school grade. Inferior books, even though widely read, are not included in the list while books of unusually high literary merit are starred. Data for boys and girls are given separately under each grade; in the information included under each title is a typical comment made by a child, number of children reporting, percent liking book, age and reading grade of children, interest value, and index of popularity. Following the graded lists is an index arranged in order of the median ages of children who read and enjoyed the books and list of books for children from eight to thirteen years. A complete index giving the author, subject, and title is included.

Terman and Lima studied approximately two thousand children, securing data from the home, school, children's bookshops, libraries, and book lists and children themselves, in an effort to determine the reading interests of children. Judgment factors, rather than statistical procedures, were used in compiling these book lists, which are not so much lists of what children do read, as they are lists of worth-while books that children would read were they given an opportunity to do so. The authors discuss reading in terms of the development of reading interests, individual differences, differences in mental ability, sex differences, and desirable and undesirable books. Certain volumes in the book lists are starred for the benefit of those who wish to make a limited choice. After each title is given the age range for which the book is best adapted. The appendices include a description of the methods used in the investigation, a list of publishers, and an index of authors and titles.

CARTER V. GOOD

Miami University

KENNON, LAURA H. V. *Tests of Literary Vocabulary for Teachers of English.* New York, Teachers College, Columbia University, 1926, 78 pp. (Teachers College, Columbia University, Contributions to Education, No. 223)

"To teachers in general and to teachers of reading in particular has been appointed the task of helping in the development of pupils' rich and meaningful vocabularies," but to accomplish this the teachers themselves must have a substantial and significant vocabulary of words which occur in literature. Upon the basis of this statement the author has selected words and arranged a test which would measure the extent to which such a vocabulary is the possession of the teacher. The words chosen occur in supposedly familiar or famous passages of English prose or poetry and in the prose or poetry of a certain historical period. Words which have become a part of the English literary background or belong to the technical vocabulary of general literature are also included.

If we grant the basic statement of the author, we may raise but one question in regard to the test: Are the words selected so as to measure extent of rich and meaningful vocabulary? More specifically, we may ask whether a definite acquaintance with the words which have been chosen represents a distinctive asset in the preparation of English teachers. If the selections which contain these words are to be taught in our English classes, the teachers who supposedly have had special training in this field may be expected to know the words sufficiently well at least not to be misled by words of similar spelling or pronunciation.

E. J. ASHBAUGH
Ohio State University

Publications Received, September 15 to October 15

Benson, C. E., and others. *Psychology for teachers.* Boston, Ginn, 1926. 390 pp. $2.00.

Book, W. F. *Learning how to study and work effectively.* Boston, Ginn, 1926. 475 pp. $1.96.

Cavins, L. V., and Bowman, E. L. *The financing of education in West Virginia.* Charleston, W. Va., State Department of Education, 1926. 94 pp.

Coleman, B. B., Uhl, W. L., and Hosic, J. F. *The pathway to reading.* New York, Silver, Burdett, 1926. Sixth reader. 378 pp. $.96.

Condon, R. J. ed. *The Atlantic readers.* Boston, Little, Brown, 1926. Book 1. The understanding prince. 336 pp. $.85.

Doermann, H. J. *The orientation of college freshmen.* Baltimore, Williams & Wilkins, 1926. 162 pp. $3.00.

Freeman, F. N. *Mental tests; their history, principles and applications.* Boston, Houghton Mifflin, 1926. 503 pp. $2.40.

Hamilton, C. G. *Epochs in musical progress.* Boston, Oliver Ditson, 1926. 278 pp. $1.50.

Helseth, I. O. *Children's thinking; a study of the thinking done by a group of grade children when encouraged to ask questions about United States history.* New York, Teachers College, Columbia Univ., 1926. 163 pp. (Contributions to education, no. 209) Cloth, $1.50. Paper, $1.25.

Hertzberg, O. E. *A comparative study of different methods used in teaching beginners to write.* New York, Teachers College, Columbia Univ., 1926. 61 pp. (Contributions to education, no. 214) Cloth, $1.50. Paper, $1.25.

Hillas, Marjorie, and Knighton, Marian. *Athletic dances and simple clogs.* New York, A. S. Barnes, 1926. 54 pp. $2.00.

Kennon, L. H. V. *Tests of literary vocabulary for teachers of English.* New York, Teachers College, Columbia Univ., 1926. 78 pp. (Contributions to education, no. 223) Cloth, $1.50. Paper, $1.25.

Kinscella, H. G. *Kinscella music appreciation readers.* Lincoln, Nebr., Univ. Pub. Co., 1926. Book 2. 179 pp. $.72.

Kinsey, A. C. *An introduction to biology.* Philadelphia, Lippincott, 1926. 558 pp. $1.68.

Laird, C. L., and others. *Everyday English.* Chicago, Row, Peterson, 1926. 506 pp. $1.40.

La Salle, Dorothy. comp. *Play activities for elementary schools, grades one to eight.* New York, A. S. Barnes, 1926. 179 pp. $2.00.

Loomis, A. K. *The technique of estimating school equipment costs.* New York, Teachers College, Columbia Univ., 1926. 112 pp. (Contributions to education, no. 208) Cloth, $1.50. Paper, $1.25.

McMurry, F. M., and Benson, C. B. *Social arithmetic.* New York, Macmillan, 1926. Book 3. 338 pp. $1.08.

Neal, E. A., and Storm, O. P. *The open door.* New York, Macmillan, 1926. Primer. 98 pp. $.60. First reader. 119 pp. $.68.

Ocker, W. A. *Physical education for primary schools.* New York, A. S. Barnes, 1926. 83 pp. $2.00.

Osburn, W. J. *Are we making good at teaching history?* Bloomington, Ill., Public School Pub. Co., 1926. 130 pp. $1.25.

Park, F. E. *Grey Sprite, the Silver Knight.* Boston, Lothrop, Lee, 1926. 222 pp. $2.00.

Parkinson, B. L. *The professional preparation and certification of white elementary and secondary public school teachers in South Carolina.* Columbia, S. C., Univ. of South Carolina, 1926. 270 pp. (Bulletin, no. 184)

Pierce, Lola. *The house that ran away.* Boston, Lothrop, Lee, 1926. 257 pp. $1.50.

Rice, Rebecca. *The brown castle.* Boston, Lothrop, Lee, 1926. 277 pp. $1.50.

Rich, M. I. *Classified types of literature.* New York, Century, 1926. 687 pp. $2.25.

Robbins, Orison. *A boy of Old Quebec.* Boston, Lothrop, Lee, 1926. 331 pp. $1.75.

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News Items and Communications

This department will contain news items regarding research workers and their activities. It will also serve as a clearing house for more formal communications on similar topics, preferably of not more than five hundred words. These communications will be printed over the signatures of the authors. Address all correspondence concerning this department to Doctor E. J. Ashbaugh, Ohio State University, Columbus, Ohio.

The Louisiana State Legislature passed during the summer a ten-percent luxury tax on tobacco to provide additional revenue for the public schools.

The *United States Daily*, David Lawrence's recently begun newspaper, published in Washington, D. C., is attempting a day-by-day study of the entire government of the United States through topics and subjects. President Coolidge has endorsed the project.

By the death of Superintendent H. M. Mendenhall, Upper Darby, Pennsylvania, the JOURNAL OF EDUCATIONAL RESEARCH lost a devoted friend and the community, an energetic school leader.

Mr. Leon O. Smith, assistant superintendent, Omaha, Nebraska, was again on the Summer Session faculty of Teachers College, San Diego, California, this summer. It would seem that he is giving the students of that institution material which they appreciate since he was there last summer also.

Dr. Margaret E. Noonan, professor of elementary education in New York University, died on September 4. Her work in the Virginia and Texas School Surveys and as co-author of *Arithmetical Essentials* made her well known to the school people of the country.

New York inaugurated this year the first college course in Accident Prevention for the training of industrial engineers and directors for public safety campaigns. The course is being given with the cooperation of the Museum of Safety. The initial enrollment comprised seventy men and five women, all of whom are employed in responsible positions in industry and public life.

Dr. James Carleton Bell was made Acting Director of Townsend-Harris Hall, the preparatory high school of the College of the City of New York at the September meeting of the Board of Trustees. Dr. Bell has been connected

with the college for a number of years and is well known for his research and editorial work. We congratulate him on his new position and know that the school will profit by his vision and interest.

The University of the State of New York has issued, in bulletin form, an outline of a course in educational measurements for New York State Normal Schools. The course presents the work of a term and gives the definite number of days which should be devoted to different fields of work. Each section contains a selected bibliography that should be helpful to both teachers and students.

The *Eleventh Annual Report of the National Committee for the Prevention of Blindness* relates a few significant facts in that field: (1) There were last year 234 sight-saving classes in the United States. There should undoubtedly be several thousand. (2) Training courses for teachers for sight-saving classes have been established at the University of Cincinnati, Peabody College, State Normal School at Ypsilanti, Michigan, and New York University. (3) Registration in schools for the blind last year showed only 11 percent of the pupils had become blind through the disease commonly known as the babies' sore eyes, whereas 28 percent of the children registered eleven years ago had lost their sight through this cause.

The Bureau of Educational Service of Teachers College, Columbia University, has recently issued a bibliography of research studies and articles pertinent to the work of the appointment secretary. This bibliography is preceded by a list of research studies contemplated, under way, or recently completed by various persons. The bibliography itself is classified under various headings such as teachers' agencies, state agencies, public employment bureaus, etc. Brief annotations accompany the more important items.

The Financing of Education in West Virginia is the title of a bulletin issued by the State Department of Education in an effort to make the people of that state aware of needs and possibilities at the present time. The general scope of the educational program from the kindergarten to the university, the cost of public education, the school property and bonded indebtedness, and the present method of raising school revenue are all considered in a detailed fact-finding manner. Following this are definite proposals by which educational opportunity may be equalized. The plan in brief is a county-unit organization, supplemented by a state distributable fund.

Woman's College of Alabama will initiate next year a regular summer session. Dr. T. H. Schutte, head of the Department of Education, will be Director of the 1927 session. Regular collegiate work in fine arts, home economics, and religious education, as well as courses for teachers, will be included. The institution hopes thus to serve the educational needs of the

state; an attempt is now being made to get opinions from various educational leaders suggesting the ways a summer session can be of the greatest service. Workers in education everywhere will welcome to the circle of summer sessions the Woman's College of Alabama.

The increased enrollment in our schools, increased costs of buildings and equipment, larger salaries for teachers, enlarged programs of education together with economic depression, have made it increasingly difficult for the public schools to secure the money which they need. Most cities which have had to increase their revenue by special levies, which must be voted by the people, and to secure bond issues for new buildings, by the same means, have found it necessary to carry on a campaign of publicity in order to secure a majority vote. Dr. P. R. Stevenson has collected a large amount of material regarding campaign publicity which is presented in a Bureau of Educational Research Monograph of the Ohio State University Studies. General discussion of campaign publicity, together with the activities of individuals and organizations and a large amount of illustrative material used in successful campaigns may be found in this volume.

At the annual meeting of the Board of Regents of Normal Schools for Wisconsin, the state normal schools of that state were granted teachers' college status. Courses leading to the degree of Bachelor of Education were authorized and approved at each of the nine normal schools. Effective this year, four-year courses for elementary teachers and for junior high-school teachers were authorized at Milwaukee, Oshkosh, Eau Claire, and Superior. Four-year courses for kindergarten-primary teachers were authorized at Milwaukee and Superior. Four-year courses for high-school teachers were authorized at all state normal schools effective in 1927, but no degree will be granted prior to June, 1928.

A very interesting language experiment is reported in West's *Learning to Read a Foreign Language*, published by Longmans, Green and Company. Teachers in India are faced with the difficulty of teaching pupils to read who speak Bengali, a dialect in which there is very little literature. The problem is to preserve the native tongue, not to replace it, and still afford the pupils some means of acquiring information by other than the spoken word. The experiment conducted is to give the pupils a reading knowledge of English without teaching them to speak the language. The methods used seem to be open to serious criticism in the light of modern pedagogy, but, nevertheless, the results are positive.

From Cincinnati comes a report of a large committee of teachers on *The Study of Salaries in the Cincinnati Public Schools*. It is carefully prepared and is supported by extensive statistical data. The committee believes, among other things, in the single salary schedule for training and experience, but makes no recommendation on the controversial question of a single salary

schedule for the sexes. They recommend a higher minimum salary, and slightly higher maximum salaries on the basis of training and experience with a plan for gradual readjustment to the new schedule. Such reports as this help to dispel the fear that teachers cannot be trusted to consider fairly and judicially questions which the superintendents have in the past regarded as their own prerogatives.

Mr. Edwin Hebden, for the last twelve years statistician of the Department of Education in Baltimore was retired in October on reaching the age of seventy. For the past fifty years Mr. Hebden has been connected with the public schools of Baltimore, serving in almost every capacity. He is a pioneer among school men interested in Bureaus of Research, having instituted the first of such bureaus in that city in 1912. Mr. Hebden will, in all probability, continue to do independent research work in public-school education after his retirement.

The *Report on the Age and Progress of Pupils in the Boston Public Schools* (School Document, No. 12) has recently been compiled and distributed. The age and progress of the pupils have been carefully analyzed together with the amount and causes of permanent withdrawals. It is a matter of some satisfaction to note that in this city the proportion of under-age pupils is practically identical with that of over-age pupils. While there are still laggards in the schools, they represent no such proportion of the total enrollment as they formerly did.

The *Twenty-seventh Annual Report of the Superintendent of Schools of the City of New York* for the year 1924-25 is a volume of 676 pages. It touches briefly a multitude of features of the New York school system pointing out, as tersely as can be done for a system of such great size, the significant undertakings and conditions. The report is well indexed so that any one interested in a particular fact can find any information on it, contained in the book, with a minimum of effort.

Professor Julius Sachs and Mrs. Ross Sachs of Teachers College, Columbia University, have used a $20,000 golden-wedding anniversary gift to establish an endowment fund in that institution for promoting the progress of secondary education in the United States. For 1926-27 the prize of $1,000 will be given for the best essay or treatise on "The Aims and Methods of Science Teaching in the Successive Stages of a Secondary School, and the Intellectual Equipment of the Teacher That Will Enable Him to Put These Aims into Practice." This announcement will probably reach our readers too late for any of them to compete since manuscripts must be in the hands of the Dean of Teachers College by December 1, but I am certain that all will be interested in the use which Professor and Mrs. Sachs are making of this gift to them.

The Effect of Special Training on Group Intelligence Scores

Teachers often feel that group intelligence tests reflect upon their ability and so endeavor to coach the children in order that they may make good scores; others feel that such coaching is part of their duty. Bishop reported positive training effect with upper-grade children in an article in the JOURNAL OF EDUCATIONAL RESEARCH for January, 1924. No such information, however, was available for primary children as far as the writer knew. The following experiment was conducted with two third-grade classes in order to find the extent to which definite coaching would affect the scores of the intelligence test.

Two third grades of comparatively equal mental ability were chosen and to each was given three intelligence tests. Group A was called the "control group," for no help or training was given to this group. Group B was called the "trained group," since it received special training.

The Otis Group Intelligence Scale, Primary Form A, was given, on February 26, to both groups. The median index of brightness for group A was 115.5 and for group B, 109. Three children in the control group and two children in the trained group fell below normal.

During the next four weeks group B was trained by means of similar but not identical tests. The material for these tests was taken from the Haggerty, Myer, Holley, and Pressey examinations, in addition to many informal tests constructed by the teacher.

The classes were retested on the Otis Primary, Form A, on April 2. In the control group every member except one showed a gain of from one to sixteen points in the index of brightness. The median gain was 6.5 points and the median index of brightness was 122. The trained group showed a larger gain—from 3 to 31 points in the index of brightness. There was, however, one child who lost two points and two others made no gain in the index. The median gain was 15 points. The resulting median index of brightness was 124. Thus the control group gained only 6.5 points while the trained group gained 15 points in the median index of brightness. Notice was taken as to where the children were weak in the tests, and again group B was trained in similar types of work.

The Otis Primary Form B was given on April 30. This examination was similar to Form A but a little more difficult, especially Test Number 8 which partly measures school achievement. A new factor also entered in. Since the test was administered two months after the first test of Form A, the norm had increased, for children were two months older. In the control group the median index of brightness was lowered from 122 to 119.5, a loss of 2.5 points from the second test, but a gain of 4 points over the first. In the trained group the median remained the same as the second test, 124, which was 15 points more than the median index of brightness of the first test. Table I shows in summary form the result of the experiment.

TABLE I. MEAN INDEXES OF BRIGHTNESS ON THE THREE TESTS

Date	Form	Control Group A		Trained Group B	
		Median I. B.	Gain	Median I. B.	Gain
(1)	(2)	(3)	(4)	(5)	(6)
February 26.....	Otis A	115.5		109	
April 2.....	Otis A	122	6.5	124	15
April 30.....	Otis B	119.5	4	124	15

Retesting alone proved to be effective in raising the scores in the control group, but direct training on work similar to the tests was most effective in raising scores. The study gives a little evidence that coaching or training is possible on intelligence test material. It points to the conclusion that some pupils may have an advantage aside from native capacity. However, if a test contains a wide variety of elements and is extensive enough, it is very unlikely that coaching will take place so definitely and extensively as to invalidate the results.

Emma J. Greenwood

Primary Supervisor
Lawrence, Massachusetts

Relation of Achievement in Formal Grammar to Achievement in Applied Grammar

A few weeks before the close of the semester ending May, 1926, tests in formal and applied grammar were given to more than one thousand Sophomores and Juniors in the senior high school, at Long Beach. Both tests were given the same week and each consisted of one hundred items of a sort that could be scored objectively. The applied-grammar test began as follows:

DIRECTIONS: Draw a heavy line under the correct form in each sentence.
(1) I (can't, can) hardly see it.
(2) James (done, did) his work yesterday.

The results on the two tests were correlated for 304 cases. Correlation was also found between the two tests with mental ability constant, as judged by the scores on the Terman Group Intelligence Test.

The high-school English teachers expressed their satisfaction with the validity of the tests, and a correlation of 0.65 was found between the marks given by these English teachers and the results of the tests. The reliability was obtained in the usual manner, namely, by correlating the "odds" against the "evens."

The following data were obtained:

Correlation formal grammar with applied.....0.56
Formal grammar with applied when intelligence is constant.....0.48
Formal grammar with intelligence.....0.40
Applied grammar with intelligence.....0.40
Reliability coefficient of formal-grammar test.....0.94
Reliability coefficient with applied-grammar test.....0.84

TABLE I. AVERAGE ENGLISH GRADES

	Low Sophomore English 2-B	High Sophomore English 2-A	Low Junior English 3-B
(1)	(2)	(3)	(4)
Formal-grammar test.....	74.4	72.4	67.7
Applied-grammar test	75.7	76.0	80.0

The average grades made by English 2-B, English 2-A, and English 3-B classes were summarized for the two tests and are given in Table I. It is significant that the scores on the formal-grammar test decreased while those on the applied-grammar test increased. Evidently formal grammar is forgotten but language usage improved.

In this same high school we found the following correlations between marks in other subjects:

English with mathematics and science.....0.50
Language with mathematics and science.....0.56
English with language.....0.446

In all these cases intelligence had been made constant, and the numerical average of these three correlations was 0.50. If we compare the correlation of formal with applied grammar, 0.48, to these correlations between subjects it would seem that no more relationship exists between the two sorts of grammar than there is on the average between any two of the high-school subjects of any curriculum. The application of this study to the question of the value of teaching formal grammar in the high school is limited in the degree to which the following assumptions can be questioned: (1) that the tests used are valid; (2) that formal grammar is now being taught so that maximum transfer is attained; and (3) that formal grammar has no transfer value in relation to other high-school subjects or to English courses in college. The statistical treatment of our data upholds the first assumption. On the second there is no information available. On the third it is probable that for specialists in English speech in particular and college students in general, there may be a decided transfer value. The extent of this, however, is practically unknown.

The conclusion which may fairly be drawn from the study seems to be that formal grammar has no immediate transfer value so far as applied English grammar is concerned. The correlation of 0.48 seemingly is caused by factors common to study of all high-school subjects and not by specific transfer.

DAVID SEGEL and NORA R. BARR

Long Beach, California

DEC 23 1926

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Editor-in-Chief, B. R. Buckingham
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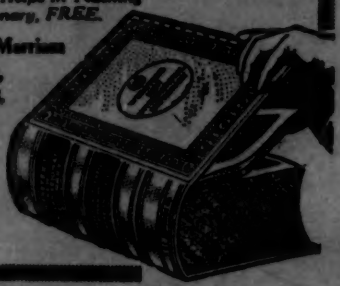

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